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MEDICAL CLINIC:

DISEASES OF THE ENCEPHALON,

WITH EXTRACTS FROM OLLIVIER'S WORK

ON DISEASES OF THE SPINAL CORD AND ITS MEMBRANES.

BY

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DISEASES

OF THE

ENCEPHALON AND ITS MEMBRANES.

FIRST BOOK.

DISEASES OF THE ENCEPHALIC MEMBRANES.

SECTION I.

DISEASES OF THE DURA MATER.

Case 1.—Fibrous vegetation on the inner surface of the dura mater, with considerable depression of the part of the brain corresponding to it—Hemiplegia—Intellect perfect—Headache of an old standing.

A military man, sixty-one years old, entered the Hospital *La Charité* in the beginning of March, 1829. He appeared to have been of a good constitution, but when he presented himself he was very much emaciated; his countenance was of a pale colour, somewhat yellowish; one-half of the right eyelid was depressed before the globe of the eye, and it was incapable of being completely raised at the will of the patient; both extremities of the right side were deprived of the power of motion, and their sensibility was impaired; the urine was passed involuntary; pulse remarkably slow.

The patient stated that, after having experienced, for a long time, rheumatic pains in different parts of the body, he was seized, about the beginning of the year 1817, with a headache, seated principally towards the anterior part of the left parietal bone. This pain was at first intermittent; then became continued for an entire year; then, from the middle of 1819, it disappeared altogether. This headache, the only thing the patient complained of, was at times insupportable. Nearly about the time it ceased, he thought the right upper extremity felt somewhat more insensible than the left, as did also the fingers of this side from time to time; they were cold, and

usually presented a violet appearance. He gradually became unable to grasp anything with the right hand. Subsequently, the right upper extremity became completely paralytic, at the same time that the left lower extremity lost the faculties of sensation and motion.

For the first ten or twelve days after entering the hospital the state of the patient did not change; then the tongue became dry, and the pulse frequent; his intellects became disturbed; diarrhœa came on; a broad eschar formed on the sacrum, and the patient died in an adynamic state towards the end of March.

Post-mortem. — Considerable emaciation. On raising the vault of the cranium, no appreciable lesion on the external surface of the dura mater. On making an incision, however, into it, this membrane was found to have contracted unusual adhesions to the subjacent parts. These adhesions were formed by cellular bands, which united the two layers of the arachnoid to each other. These bands circumscribed a spherical body of the size of a large nut, which sank deep into the cerebral substance with which it had not contracted adhesion in any other part. It was separated from it by a cellulo-vascular layer, which appeared to be the tissue of the arachnoid and pia mater compressed by it. This body was attached by a narrow pedicle to the inner surface of the dura mater, the fibres of the latter membrane being dispersed over the pedicle of the tumour, and so confounded with its tissue, that to distinguish them was impossible. This tissue, which was of considerable hardness, and of a white tendinous appearance, consisted of fibres which were, as it were, wound up one upon another; they seemed a prolongation of the fibres of the dura mater. Some infarction in the posterior part of the lungs; two white spots on the pericardium. The mucous membrane of the stomach, towards the great cul-de-sac, presented some red points; the end of the ileum and part of the colon presented a bright red colour.

Remarks. — From the nature of the symptoms and progress of the disease, one would have expected that softening was the lesion to be found in the brain in this case. That permanent flexion of the limbs oftentimes, though not always, accompanying softening, was not however here observed at any period. The rheumatic pains preceding the pain of head, might have led one to consider the latter also as rheumatic. There is not a doubt but that pain of head similar to that we have described in this case, has been many times taken as the effect of neuralgia and rheumatism. The pain of head was here the first symptom observed, and it coincided probably with the commencement of the disease of the dura mater, and continued as long as the inflammatory process, necessary for the formation of the adhesions described in the *post-mortem*, existed around the tumour, and ceased probably when the adhesions were changed into cellular tissue. The gradual manner in which the paralysis developed itself was conformable to the nature of the disease; it was not preceded by any loss of consciousness, and the intelligence was never disturbed. No lesion explained the incontinence of urine.

A bright redness of the stomach, and a portion of the intestine, coincided in this case with the adynamic symptoms under which the patient sank.*

Case 2.—Osteo-fibrous tumour, of the size of a pullet's egg, on the inner surface of the tentorium cerebelli, to which it closely adheres—Hemiplegia, with convulsive movements at intervals, on the side opposite that where the tumour was—Atrophy of the lobe of the cerebellum, corresponding to the tumour—Death by cerebral hemorrhage.

A shoemaker, forty-seven years old addicted to spirituous liquors, fell on the occipital bone when drunk, about four years before entering the *La Charité*. Immediately after the fall he experienced no uneasiness. Subsequently, however, he began to feel a dull pain towards the left part of the occipital bone, which continued for a considerable time without becoming severe. Giddiness occurred also from time to time, often followed by total loss of consciousness, which never continued, however, beyond a few minutes. At a later period new symptoms presented themselves; on a sudden the upper extremity of the right side was attacked with a painful, and as it were tetanic shock. Five or six of these shocks rapidly followed this, and during the three or four days following, the right arm continued torpid and somewhat weaker than that of the opposite side. At first there were intervals of months between these attacks: they then became more frequent, reappearing every ten or twelve days, uniformly limited to the right arm, at the same time paralysis of this limb, at first transient, became permanent, and more and more complete. Insensibly also the right lower extremity lost the power of motion; it never however exhibited any convulsive movement. Before entering the hospital he was attacked with giddiness, which, becoming more severe, determined him on applying for admission. His state then was as follows:—

The face and eyes injected; some difficulty in articulating his words; answers slow, but correct; recollection clear; diplopia from time to time; commencing deafness. The patient complains of a dull pain towards the back part of the head, on the right side as well as on the left. The two extremities of the right side cannot be moved at the will of the patient; they exhibit however a certain rigidity, and yesterday again the arm underwent five or six shocks, which caused the patient to suffer considerably. Pulse very hard, but not frequent. The pulsation of the heart strong. The muscular system even still remarkably well developed.

Just when I had drawn up these details, and we were going to bleed the patient, he was seized with all the symptoms of apoplexy, and died the following day.

Post-mortem. — In the place ordinarily occupied by the left part of the tentorium cerebelli, there was found a large tumour which compressed the posterior lobe of the cerebral hemisphere of this

* For some very interesting cases illustrating the effects of pressure from tumours, see Dr. Bright's Reports of Medical Cases, vol. ii. part 1, p. 342, &c.

side, and also the cerebellum. The structure of the cerebral hemisphere not changed, *the tumour being principally developed on the side of the cerebellum*, the entire left lobe of which had undergone a most remarkable change, it being very much diminished in volume, and its substance having acquired extraordinary hardness. Neither the cerebrum nor cerebellum were continuous with the tumour. Interposed between them, and evidently produced at the expense of the dura mater, whose place it occupied, this tumour very much resembled that described in the preceding case, except that it contained in some parts a little calcareous deposit. In the right hemisphere of the cerebrum was found an enormous sanguineous effusion, which, occupying the corpus striatum and optic thalamus, had made its way into the two lateral ventricles through the lacerated septum. The parietes of the heart were hypertrophied.

Remarks. — In this, as in the preceding case, the cerebrum was not all affected; but one of the lobes of the cerebellum, being compressed by it, underwent considerably atrophy. Still none of those functional disturbances, which, according to authors, are connected with lesions of the cerebellum, were here remarked. The symptoms were just the same as if the tumour were seated in the cerebrum. The development of the osteo-fibrous tumour of the dura mater, seemed to be owing originally to the fall which the patient had suffered several years previously.

SECTION II.

DISEASES OF THE ARACHNOID AND PIA MATER.

There are few diseases whose symptoms present so many varieties and so many individual differences as acute inflammation of the meninges. Are there well marked signs, by the aid of which we may readily distinguish during life inflammation of the meninges lining the upper surface of the brain from that connected with the lower surface of this organ? Are there any special functional disturbances appertaining to inflammation of the membrane lining the parietes of the ventricles? By what signs can we recognise inflammation of the membranes lining the spinal cords? Whatever be its seat, can acute meningitis be distinguished by its symptoms, either from the other acute affections of the encephalon, in which this organ is found materially changed, or from those very frequent cases in which irritation of the brain or its coverings, merely sympathetic of irritation of some other organ, leaves no trace of its existence in the dead body? In a word, in the dead body itself, what are the anatomical characters by whose aid we shall be enabled to affirm that there really was acute meningitis in the cases where, during life, symptoms existed which seemed to belong to it? Such are the questions as yet undetermined in science, in the solution of which we think the following cases will assist.

CHAPTER I.

CASES OF DISEASES OF THE ARACHNOID AND PIA MATER COVERING THE UPPER SURFACE OF THE BRAIN.

Case 3. — Effusion of blood between the Arachnoid and Dura Mater.

A coachman, seventy-three years of age, of a strong constitution, had fallen from his seat nine years previously, and received a deep cut in the left temporal region, for which he was trepanned at the *La Charité*. He had not lost his consciousness from the fall, and after it he continued to enjoy perfect health.

Towards the 20th March, 1822, he felt, without any known cause, both in the lower extremity and in the arm of the right side, a numbness, with difficulty in moving these limbs, pains also in the elbow and heel; at the same time vertigo, ringing of the ears, headache, and somnolence. The following days there was gradual augmentation of these symptoms, and at length he became unable to follow his usual calling. Three days before entering the hospital the motions of the left lower extremity began to be difficult.

When he entered the hospital on the 6th of April, 1822, he presented the following state: — obstinate constipation, tongue natural. The two extremities of the right side could still perform some motions, but very feebly; the left lower extremity was somewhat less weak than the right; pulse full and strong. Twenty leeches to the neck, friction on the limbs with camphorated spirits.

On the 8th, a diminution of the vertigo, headache, and somnolence; had two evacuations in twenty-four hours. Eighteen leeches to the neck, sinapisms to the legs. On the night of this day delirium set in. The following morning less pain of head, but the paralysis more marked. The three following days a gradual increase of the latter. On the 13th the countenance very much injected, drowsiness, pain on moving the right arm; hemiplegia of the left side incomplete, whilst that of the right side is complete; tongue red and dry, fæces and urine passed unconsciously; pulse strong and quick; skin hot and dry (enemata and leeches to the neck, and blisters to the legs with diluent drinks). On the 14th, respiration stertorous; total loss of consciousness; coma. He died in the evening.

Post-mortem. — The arachnoid thickened and red, was detached from the dura mater of each side by an effusion of blood, partly fluid and partly coagulated, which had completely separated the serous membrane from above downwards, from the part adjoining the great falx of the dura mater to the temporo-parietal suture, and from before backwards, from the coronal fossa to the posterior end of the parietal. The detachment and effusion were more considerable on the left. The depression of the hemispheres was nearly an inch on the left, only half an inch on the right. Beneath the effusion

the cerebral substance was very firm, and presented very few bloody points, but the sinuses contained a considerable quantity.

Remarks. — We have here a rare case of pathological anatomy. It is not easy to conceive how a thin fine membrane, such as the arachnoid is, can be separated from the dura mater by effused blood without being torn.

The symptoms here were altogether in relation to the seat and nature of the lesion. The prevailing symptoms existed at first with respect to motion; there was double paralysis, as there was double effusion. It was not till a later period the intellectual faculties became disturbed. The hemorrhage, slowly produced, acted at the same time by compressing and irritating the brain.

Case 4.—Effusion of blood between the Arachnoid and Dura Mater—Gradual paralysis of the right side with permanent flexion.

A man, seventy years of age, of a lymphatico-sanguineous temperament and weakly constitution, felt, for the last two months, on the left side of the head, and particularly in the temporal fossa, a constant headache, which went on increasing up to the 4th of May. We could obtain no particular account with respect to the nature of this pain, and the symptoms accompanying it. We only know, that at the above mentioned period, the patient began to stammer, the tongue became embarrassed, the intellect seemed weakened, and in the morning the right side of the body was imperfectly paralysed. This hemiplegia made very slow progress on the following days. There was added to it continued fever with adynamic symptoms. When brought to the hospital on the 15th of May, he presented the following state :— Prostration, lying on his back, pupils equally moveable, countenance very flushed, features drawn to the right, lips dry, tongue red, dry, cleft, trembling, but no deviation to either side; breath fetid, stools and urine passed involuntarily. Considerable heat of skin, with moisture; pulse strong, full, and frequent. The extremities of the right side present a paralysis of motion, but not of sensation. To this is added, in the upper extremity, strong contraction of the flexor muscles of the fore-arm on the arm; the patient seems to understand what is said to him, but he answers very indistinctly. Great drowsiness (two blisters to the right lower extremity, one to the thigh, one to the leg). On the 16th and 17th, gradual increase of the hemiplegia; the rigidity of the upper extremity continued up to the 20th, when there was observed stupor, stertor, total extinction of intellect (twenty-five leeches to the neck, two sinapisms to the feet). On the 21st the rigid contraction of the right arm ceased, total loss of motion and sensation on the right side, breathing stertorous, eyes dull, pupils equally moveable, pulse continually full and strong, skin hot and moist (sixteen leeches to the neck). Died at ten o'clock at night.

Post-mortem.—The vessels uniting the bones to the dura mater appeared very much injected on the left side; on dividing this membrane we found between it and the arachnoid, along the posterior, three-fourths of the lateral wall of the cranium, and from its base to

the falx of the dura mater, an effusion of blood partly liquid, partly coagulated, black, depressing the serous membrane for nearly an inch at the centre, gradually diminishing in thickness to the circumference. The two folds of the arachnoid were red and thickened. The cerebral substance of the two hemispheres were dotted with blood; a little serum in the ventricles; heart very soft and flaccid; brownish colour of the gastric mucous membrane, towards the great curvature.

Remarks. — One of the most curious circumstances in this case is that the symptoms connected with it, very much resemble those occurring ordinarily in softening of the brain. Thus, the disease commences by a cephalalgia fixed to one point of the head; then the intelligence becomes impaired; subsequently the limbs opposite the side of the head affected with pain become gradually weakened, and ultimately the paralysed limbs present a well marked contraction. All these are the signs of softening of the brain — still not the slightest trace of this alteration; nothing being found but a collection of blood between the dura mater and arachnoid, the latter being also thickened and diseased.

Case 5.—Partial Meningitis—Erysipelatous phlegmon of the neck supervening on a contusion of this part—Signs of arachnitis only during the last hours of life.

A postilion, thirty-three years of age of a strong constitution, received, on the 2d February, 1822, on the right side of the neck, a very heavy sac of oats, which fell on him from a height of several feet. He, however, continued his customary occupation till the 7th. He felt a painful tension on the right side of the neck, at which part the skin assumed an erysipelatous appearance; fever came on, and the patient kept his room. The fever continued on the 8th, 9th, and 10th, and the erysipelas spread. On the 11th he entered the hospital, when the fever was very high; the neck was covered with leeches. Desquamation commenced at several points of the skin of the neck; but on the right, behind the sterno-mastoid muscle, an obscure fluctuation was observed; this muscle also seemed more prominent than that of the opposite side; no other morbid symptom; no stool for three days. At one o'clock in the morning the patient suddenly became delirious. On the 12th, at eight o'clock, the delirium still continued; eyes haggard, constantly rolling; pupils very much contracted; violent screams; free motion of the limbs; pulse frequent and very weak; tongue moist and red; burning thirst, no stool; some leeches applied the preceding day still bleeding (blister to one thigh, sinapisms to the legs, purging enemata, acid drink). Three hours after the visit he expired.

Post-mortem.—Arachnoid and pia mater natural in every respect, except for the space of three fingers' breadth in length, and two in width, near the anterior extremity of the upper surface of the left hemisphere of the brain. There the membranes were thickened and red. A small quantity of limpid serum in each lateral ventricle; the posterior part of the two lungs infarcted; the mucous membrane of the stomach presented, at the pyloric portion, a slight brownish

tint; the spleen very soft; a great quantity of pus infiltrated the cellular tissue beneath the sterno-mastoid muscle of the right side.

Remarks. — This is a very remarkable case. It is probable that the partial arachnitis, ascertained in the dead body, commenced only with the delirium; the disturbance of the intellect, and a striking contraction of the pupils, were the only two phenomena occasioned by this inflammation; at times these very slight inflammations of the meninges are sufficient to disturb the intellect. We may note also, that here the inflammation was seated at the anterior and superior part of one of the cerebral hemispheres, where, in fact, several physiologists more particularly place the seat of intellect. But why this contraction of the pupils? What relation between an irritation so slight, and so well circumscribed, of a very small portion of the meninges, and the movements of the iris? The nervous centres may then be injured in their functions, without the anatomist being able to discover any alteration.

Case 6.—Acute meningitis limited to the convexity of the left hemisphere of the brain —Delirium.—Convulsive movements of the face and extremities of the right side.

A tailor, thirty-seven years of age, had been sick for four or five days when he entered the hospital, 17th July, 1821. On the 15th of this month, without any known cause, he was seized with violent pain of head, particularly seated in the frontal region. On the day after, the headache continued, and the pain became more general, being extended now to the parietal and occipital regions. On this day he lost his appetite, and vomited some drink he had taken. In the evening constant nausea still appeared, followed from time to time by a throwing up of some bitter yellow matter. On the 17th, the headache still continued, but the vomiting ceased; some nausea still. Having entered the hospital, he presented on the next day's visit, the following state: — face remarkably pale; pain of head, the precise seat of which cannot be pointed out by the patient; at intervals this became so very severe as to make him utter piercing cries; eyes dim and languid; slight involuntary motion of the muscles which move the commissure of the lips; his answers accurate; gives a perfect account of his state, and of every thing which happened to him since the commencement of his illness; the pulse moderately frequent, and regular; everything else natural.

It was difficult to assign a precise seat to this group of symptoms; the first complaints, however, regarded the head; the vomiting might be considered as connected with a commencing cerebral affection, and the severe headache seemed to point out the head as the seat of the disease. The absence of any morbid phenomenon, with respect to the alimentary canal, repelled the idea that the headache was sympathetic of gastro-intestinal irritation. The absence of all febrile disturbance precluded the possibility of its being mere continued fever. The state of the patient, however, appeared very alarming; the appearance of his countenance, and, amidst this absence of local symptoms, the great alteration already of his fea-

tures, obliged us to form a rather unfavourable prognosis. M. Lerminier suspecting a state of encephalic congestion, applied, notwithstanding the extreme paleness of his face, twenty leeches across each jugular vein. Demulcent drinks, and sinapisms to the lower extremities. No change in the patient on the following morning.

On the 20th, he was very much cast down, and answered questions with difficulty and reluctance: light was painful to him; he kept his eyes closed, and his head concealed under the bed-clothes; face very pale; pain of head not great; the convulsive movements of the lips more frequent and more marked; pulse and skin natural (blister to the nape of the neck). In the night he emerged from a state of stupor, in which he had been for the last twelve hours. — He got up out of bed suddenly, saying that some persons were pursuing him to do him harm. He raved during the night, and occasionally uttered several piercing cries.

On the 21st, he was kept in bed by force. The face had now become red; the head was agitated by a continual movement, which carried it from right to left, and left to right; the muscles moving the lips, the alæ nasi, and the eyebrows, were in the highest degree of convulsive agitation; saliva, slightly frothy, flowed in great abundance from the mouth; he spoke incessantly and with energy, but his articulation was unintelligible; great *subsultus tendinum*, which prevented the pulse from being felt; its frequency did not seem very great (bleeding from the arm, twenty leeches to the neck, cold applications to the head). No change on the 21st.

On the 22d, violent delirium; convulsive motions of the muscles of the face: *risus Sardonicus;* continual motion of the right arm, subsultus increased; pulse more frequent; tongue moist and red (two blisters to the thighs; ice to the head).

On the 23d, head turned back, and to the right; strong contraction of the right arm; respiration very irregular; occasionally accelerated; it then becomes slower than natural. The patient silent and quite still; eyes fixed, and void of expression; mouth open and unmoved; pupils neither contracted nor dilated; answers no questions; does not even seem to understand them; original paleness of face returned; pulse sixty a minute, and regular; bowels not free; tongue cannot be seen; teeth not dry. He remained quite torpid during the day, but at night violent delirium reappeared; uttered very loud cries.

On the 24th, this excitement was succeeded by profound coma; extremities cold; a clammy sweat covered the face; respiration rattling. He died in the course of the day.

Post-mortem. — On the upper surface, a considerable difference in the colour of the two cerebral hemispheres, the right being pale, whilst the left presented a well-marked red tint, which resided entirely in the subarachnoid cellular tissue, which was traversed by numerous vessels; neither serum nor pus in this tissue; the grey substance constituting the most superficial portion of the convolutions of the left hemisphere participates in the injection of the pia

mater covering it. The ventricles contained scarcely two tea-spoonfuls (*cuillerées a café*) of serum; nothing remarkable in the rest of the brain. The lungs infarcted posteriorly; the heart contained in its right cavity a large fibrinous clot, deprived of its colouring matter; the mucous membrane of the stomach very thin towards its great curvature,

Remarks.—This case presents an example of acute meningitis more extensive than the preceding case, but still partial; it occupies, in fact, but one of the sides of the brain, the median line accurately limiting it. The first symptom was pain of the head, which was of long duration and remarkably severe. This, after a little, was complicated with gastric symptoms, which appeared entirely the sympathetic result of the brain affection. The nausea and vomiting arose from the disturbance of innervation, but these sympathetic phenomena soon disappeared.¶ The brain symptoms gradually became worse. The intellect, also, so perfect when he entered the hospital, became gradually disturbed. The slight convulsive movements of the lips were soon succeeded by convulsions of the entire face and of the right arm, which latter was ultimately found to be permanently flexed. This disturbance in the motion of the right arm might cause us to anticipate that the opposite side of the brain was the seat of the disease; the pain of head not being confined to the affected part of the cerebral membrane, could not assist in determining it. The therapeutic means adopted seemed to have had no influence whatever on the disease. A little more blood than natural, accumulated in a circumscribed portion of the pia mater, was enough to destroy the nervous functions, and ultimately life.

Case 7.—Meningitis limited to the anterior extremity of each cerebral hemisphere—Rosy tint and slight softening of the subjacent grey substance—Follicular enteritis proceeding towards a cure—Symptoms of ataxic fever.

A boy, seventeen years of age, entered the hospital February 18th, 1824, with symptoms of slight continued fever; headach; tongue white, moist, slightly red at the point and edges; thirst considerable; constipation; no change in his state for the five or six days following, during which interval he was bled from the arm, and twenty leeches were applied to the anus.

On the 24th, we were struck with the air of distraction in the patient's countenance; he answered questions with difficulty, and appeared to be absorbed in thought.

On the 25th, he was sunk in stupor; pupils perceptibly dilated; tongue natural; pulse small and frequent; skin hot (twenty leeches to the neck). During the two following days no change.

On the 28th he emerged from the stupor, became restless, and spoke continually.

March 1st, stupor returned; dilatation of the pupils extreme; tongue quite natural; pulse very small and frequent; notwithstanding the torpid state of the patient, the cutaneous sensibility was very much increased; he complained whenever we touched the

skin, particularly on the thorax and abdomen; he pushed the hand which touched him, and complained of pain (leeches again to the neck, and blisters to the legs). He died the next night.

Post-mortem. — Fulness of the veins traversing the convexity of the cerebral hemispheres; the portion of the pia mater covering the anterior extremity of each of the hemispheres very much injected; rose-coloured tint, together with slight diminution in consistence, of the cortical substance in contact with the pia mater at this part of the brain. No other appreciable alteration in any part, except that the lungs contained some small granulations not resembling those usually met with, which, when cut into, allowed a small quantity of limpid serum to escape. The inner surface of the stomach was very white, except one small spot, which was red, and seemed formed by the aggregation of small vessels finely injected. In the small intestines several of the follicles were more developed than natural; some single, and others aggregated together, constituting what are called *Peyer's glands;* they presented black points, and projected somewhat beyond the level of the mucous membrane.

Remarks. — This is another case where inflammation of the membranes existed only in a very small extent of the external surface of the brain. The pia mater was injected merely towards the anterior and upper part of each hemisphere; and in this part the grey substance of the circumvolutions participated in the irritation of the membrane covering it. This is all that was found to explain the serious nervous disturbances which manifested themselves on the last days of the patient's life. No doubt but the patient died in consequence of the lesion of the nervous centres. The entire disease, however, did not reside here; for, on entering the hospital, nothing manifested itself but mere continued fever, without any well-marked local symptom; the intestine was then diseased, and we doubt not but that, at first, there was follicular enteritis, which was in progress of cure, as appeared from the *post-mortem;* then the partial meningitis supervened, which rapidly gave the most serious character to a disease till then mild.

Case 8.—False membranes of recent formation on the arachnoid, lining the convexity of the left hemisphere—No other appreciable lesion of the meninges—Headache at the outset—Delirium—Tubercles in the lungs and spleen.

A man, forty-three years of age, entered the Hospital *La Pitié* at the commencement of the month of April, 1831, presenting the ordinary symptoms of pulmonary phthisis. On the 19th of May he complained of an acute pain, seated in the left temporal region. — This pain, which was not increased by pressure, became occasionally insupportable, and then radiated towards the parietal and orbital regions of the same side of the head. This was the first time he complained of such a pain; it had appeared the night previous, and prevented him from enjoying a moment's sleep. No other change in the state of the patient; the pulse was, as we usually found it in the morning, from 70 to 80; no appreciable disturbance in sensa-

tion or motion. This pain, then single, and unaccompanied by any other symptom, was considered mere temporal neuralgia, and nothing particular was prescribed. However, the following day and night the patient suffered dreadfully in the temporal region. — On the 20th of May, though seeing no reason to change our diagnosis, we had him bled from the arm to twelve ounces; the blood, examined the next day, consisted of a small clot, rather black, without any appearance of the buffy coat, and encompassed by a great quantity of serum. The pain of the left temple had not diminished; no other new symptom manifested itself. On the 21st, still headache; no change at all; twenty-four leeches were applied to the left mastoid process, which bled freely, but the headache is as intense as ever. Conceiving the affection to be a neuralgia, we applied an opium plaster to the left temple, and ordered a grain of hyoscyamus to be taken internally. On the 23d, 24th, and 25th of May, no change; but on the 26th we remarked, for the first time, that the skin of the two eyelids, as also those of the cheeks, was raised by serum accumulated in the cellular tissue; this skin preserved its natural colour; headache continued; the pulse was, as usual, 80; a blister was applied to one of the lower extremities.

On the night of the 27th, the intellect disturbed for the first time, he arose from bed, and became very noisy. Towards morning the delirium ceased, and at the visit we found him as usual, except that he complained less of the temple. On the night of the 28th, the intellect again disturbed, and delirium returned; in the morning he answered questions very incoherently; the œdema of the face increased, without the skin being red; pulse 88, and the temperature of the skin raised. In the course of the day the patient became comatose, and died on the 29th.

Post-mortem, twenty-nine hours after death. — The cranium being raised, and the dura mater divided, we found covering the convexity of the left hemisphere of the brain, at the point of union of the middle and anterior lobes of this hemisphere, a whitish false membrane, soft and not yet presenting any character of organisation, and merely in apposition with the arachnoid, to which it did not adhere. This false membrane was somewhat broader than a dollar. On other points of the arachnoid, of the same side, there were deposited as it were small drops of white, thick pus, which we raised on the back of the scalpel. Two or three such drops were found on the portion of the arachnoid covering the left surface of the great falx cerebri; no other appreciable alteration in the arachnoid or brain. In the thorax were numerous tubercular masses, some of which were softened. The internal surface of the stomach presented a slate-colour tint, with papillary thickening of the mucous membrane along the great curve. About a quarter of the spleen converted into a large tubercular mass.

Remarks. — This is one of those rare cases wherein the arachnoid, properly so called, is the seat of the disease. It is in fact in its cavity that the morbid products existed. On the right every thing

remained in the most natural state. It is a case of real arachnitis, similar in every respect to inflammation of serous membranes elsewhere. This inflammation of the arachnoid will easily explain the different nervous symptoms during life. Thus the pain which affected the left temporal region so long and so severely, was not a mere neuralgia. It marked the commencement of the arachnitis, and for a long time continued alone, and it was only towards the end, that more decided symptoms of arachnitis appeared, first delirium and then coma, which was followed by death.

Case 9.—Partial meningitis—Tubercles in the pia mater, and in other organs; adhesions of two circumvolutions—Headache at first; afterwards delirium; contraction of the muscles of the neck; paralysis of some muscles of the face.

A man, nineteen years of age, on entering the La Charité, complained of a violent headache, principally seated towards the right temple, under which he has been labouring now twelve days. His intellect perfect; he constantly lies on the left side. Pulse slow (sixty a minute); the pupils a little dilated; countenance expresses an air of indifference; tongue natural; has some difficulty in passing urine. This group of symptoms make us apprehend the development of a cerebral affection; he was ordered to be bled from the foot, and forty leeches to be applied to the neck. The day after (14th March) the air of indifference was succeeded by complete delirium; the head remained constantly inclined to the right; pulse now seventy-two. He was bled from the arm. In the evening he can now answer questions tolerably, which he could not in the morning. When we attempt to incline his head to the left, he evinces pain; the right side of the mouth then opens, whilst the left half remains unmoved.

March 15th. Look fixed; head still inclined to the right; delirium still continued; air of stupor; pulse more frequent than on the preceding days; tongue natural; abdomen free from pain: no evacuation by stool (thirty leeches to the neck, laxative enema).—Whilst the leech-bites were still bleeding, the pupils, which till then had remained dilated, contracted in a very remarkable manner. The pulse became very frequent, irregular, and small; the mouth became filled with foam; the tracheal rale set in, and the patient died at half-past twelve at noon.

Post-mortem. — The pia mater covering the upper surface of the cerebral hemisphere, contained about twelve small whitish granulations, the size of a lentil, and of cartilaginous consistence. They were found between the convolutions. On the middle lateral part of the right hemisphere, was observed a bright red injection of the pia mater, for a space as large as two five-franc pieces put together. Between two circumvolutions of the middle lateral part of the left hemisphere, was found a white tubercle of the size of a large pea, softened at its centre. These two convolutions had contracted intimate adhesions, and were confounded with each other. Numerous tubercles in a crude state traversed the lungs. The lymphatic

ganglions of the posterior mediastinum also tuberculated. Three small tubercles in the spleen.

Remarks. — Of the alterations found after death in the body of this patient, some were dated from a period long prior to the attack of the disease under which he fell. Such were the tubercles in the pia mater, in the lungs, in the lymphatic ganglions of the posterior mediastinum, and in the spleen. The adhesion also of the two convolutions of the left hemisphere was a lesion of long standing, and prior to the disease observed by us; to explain the latter, then, we have but the injection of the pia mater in a very small portion of its extent, without any other alteration of this membrane, or of any other part of the encephalon. When the lesions were so slight and the symptoms so severe, who would dare to affirm that these lesions represented everything that did exist, and that anatomy showed us everything that was materially altered in the nervous centres? Certain it is that the only appreciable alteration of recent formation, discovered on opening the body, existed in these centres; and it was here also during life, that the entire disease seemed to reside. For a considerable time it appeared unattended with anything serious; and obstinate headache, situated towards the point where, after death, we found the pia mater injected, was for the first twelve days, the prevailing symptom. When we saw the patient, his intellect was perfect, his faculties of motion and sensation were unimpaired, and he had no fever. Still from the very first we were struck with his position when in bed, and this phenomenon, added to the air of indifference expressed in his countenance, directed our attention to the brain. On the following days the disease, which had been at first mild, was accompanied by most marked and alarming nervous symptoms. Delirium, partial paralysis of the muscles of the lips, painful contraction of the muscles of one side of the neck, particularly engaged our attention. Whilst these phenomena were developing themselves, the pulse became accelerated, the tongue preserved the most natural appearance. In this case the most active antiphlogistic treatment was employed.

During the three days the patient remained in the hospital, he was bled twice, and seventy leeches were applied to his neck. Still the most serious symptoms supervened every day, and we shall even remark, at least as a mere coincidence, that it was immediately after the application of the last leeches that the struggle commenced. Had the loss of blood any share in the symptoms which appeared during the last hours of life? we should be inclined to think it had.

Case 10.—Milky infiltration of the pia mater on the upper surface of the cerebral hemispheres—Turbid serum in the great cavity of the arachnoid—Suppuration of the pituitary gland—Vegetation on the aortic valves, with production of encephaloid matter at their base—Delirium—Hurried respiration—Pleurosthotonos.

A man, sixty-four years of age, was brought to the *La Charité* on the 27th of May. Those who brought him stated that he was ill for the last fourteen days, but gave no other information regard-

ing him. On the next day he presented the following state:— Countenance very pale and dejected; lies on his back; œdema around the ankles; delirium; complains continually; voice weak and trembling: respiration high, hurried, very painful, as if there were some obstacle to the free entrance of the air into the pulmonary vesicles; no lesion, however, detected by auscultation in the lungs; the air appears to penetrate in every part; the pulse, being very small, contrasts with the strength of the pulsations of the heart, which are accompanied with a well-marked bellows sound; tongue natural; abdomen soft (diluent drinks, sinapisms). On the 29th, his entire body strongly inclined to the right: the muscles of the neck, and those of the trunk of the same side, being spasmodically contracted, prevented the neck and head from being brought into the straight position; still less could they be made to deviate to the left. To these symptoms of pleurosthotonos were joined delirium, great dyspnœa, extreme frequency of the pulse, which was at the same time thready. Died at noon.

Post-mortem. — Body very much emaciated; œdema of the lower extremities.

Cranium. — The great cavity of the arachnoid contained a considerable quantity of milky serum; the pia mater lining the upper and lateral surfaces of the cerebral hemispheres was infiltrated with liquid similar to thick cream; no trace of the pituitary gland to be found in the sella turcica; in its place there was a collection of pus.*

Thorax. — Lungs and pleuræ sound; a little serum in the pericardium; right cavities of the heart distended by an enormous clot of blood; one of the aortic valves had, on its ventricular surface, a greyish vegetation, easily detached with the scalpel from the tissue on which it rested; another of the aortic valves had entirely lost its usual appearance; it was changed into a reddish mass, and towards its point of union with the internal membranes of the vessels, the latter presented an evident fluctuation; a slight incision was made on the point where this fluctuation existed, and there escaped between the lips of the incisions a chocolate coloured matter, of a softish consistence, like a mixture of blood and cerebral matter. It is more probable that this was blood effused and altered, than the result of a morbid secretion.

Remarks. — In this case, which we had not the opportunity of seeing till a very advanced stage, the membranes were more seriously affected than in any of the preceding. First, they were changed to a greater extent; then there was not only hyperemia, but purulent secretions on the two surfaces of the arachnoid, and, what is most unusual, suppuration of the pituitary gland.

The symptoms first observed were those usually accompanying meningitis of the convexity of the hemispheres. How shall we

* From the situation of this organ, which is such as to protect it from injury, it is probable that there are some very important functions assigned to it, with the nature of which we are totally unacquainted. Considerable importance has been attached to it as connected with epilepsy. Dr. Bright mentions a case, vol. ii., p. 301, where it was wanting.

account for the pleurosthotonos, whilst the lesion of the membranes was the same on the right and left? The principal cause of the difficulty of respiration appears to have been the alteration of the sigmoid valves of the aorta. This was probably the cause of the bellows sound.

Case 11.—Purulent infiltration of the sub-arachnoid cellular tissue of the upper and inner surface of the two cerebral hemispheres—Bright red injection circumscribed to the middle lateral portion of the left hemisphere—Tubercle in the brain—Pain of head; hemiplegia of the right side; dulness; vomiting; infrequency of pulse.

A boy, seventeen years old, felt for the preceding fifteen days violent pains of the head, and experienced for the last two days only commencing weakness in the lower extremity of the right side, when he entered the hospital on the 24th July, 1822. His state then was as follows:—Countenance very pale, slightly puffed: pupils natural; vision and intellect perfect; the lower extremity of the right side seems to the patient heavier than the left. Since the preceding night only he began to feel some difficulty in moving the upper extremity of the right side, and it seems heavier to him than the other; the sensibility of both these limbs, however, is unimpaired; pain of head very acute, and occasionally extorts loud cries from the patient; pulse irregular, but not frequent: respiration laboured, and the intervals between each inspiratory movement unequal (twenty leeches behind each ear, sinapisms to the legs). A few hours after the visit the patient fell into a profound stupor. The following morning, 25th July, the coma disappeared; intellect perfect; answers precise; pain of head continues; paralysis of the right side increased; pulse very irregular, and fifty each minute; vomited a green bitter matter twice or thrice during the night; tongue still the same (thirty leeches to the neck, two blisters to the legs). On the visit of 26th sunk into a profound coma; his countenance, however, indicates pain, when the limbs are pinched; pulse preserves its slowness and great irregularity; skin cool and moist (a blister to the nape of the neck). On the 27th, eyes open, but immoveable; vision appears to be gone; he seems not to understand any thing; and articulates not a word (stimulating frictions to the limbs; ice to the head: sinapisms to the legs). On the 28th, pulse ninety-six. On the 29th, other symptoms appear; the eyes and face are become the seat of slight convulsive twitches, which are repeated at short intervals; coma not increased; he stares at those questioning him, without answering; distinguishes objects well; complains very much; retracts the arm a little when it is pinched; this arm when raised falls as an inert mass, whilst he holds the left arm raised without any effort; pulse eighty; the respiration proportionally more accelerated than the circulation (ice to head continued). On the 30th, the intellect returned, the patient answers questions, hears and sees perfectly; pulse ninety-two, and the respiration still accelerated; paralysis of the right side continues. On the 31st, the patient, whose state for the last two days was so perceptibly

improved, relapses into coma ; during the day the respiration, which is now accompanied with a rattle, becomes more and more accelerated, and the patient expired, as if in a state of asphyxia, during the night.

Post-mortem. — The pia mater covering the upper surface of the two hemispheres was infiltrated with a thick purulent layer; the arachnoid itself being in its natural state. On the left, below the pia mater, near the great interlobular fissure, several circumvolutions present a bright red appearance ; some even present a uniform red tint ; the tissue of the circumvolutions in other respects natural ; outside the left lateral ventricles, on a level with the ancyroid cavity, the cerebral substance contains a tubercle the size of a large pea, developed in a mass of grey substance. Tubercles were found in great numbers in the two lungs.

Remarks. — In this case the membranes were not only injected, they were also the seat of purulent secretion. One of the most striking of its symptoms was the paralysis of one side of the body, which developed itself from the commencement of the disease, and went on increasing. It seemed as if the left hemisphere of the brain was subjected to some compression, and yet such did not appear. The purulent layer between the arachnoid and brain was on both sides ; on the left only some of the circumvolutions participated in the irritation of the membranes, inasmuch as they were considerably injected. If that were the cause of the paralysis, why was it not preceded by a state of contraction of the limbs, as happens very often in inflammation of the cerebral pulp ? Beside this permanent symptom we find others remarkable for their appearing and disappearing alternately ; thus the intellect went and returned ; the very evening before death it was quite perfect ; still it is very probable that these lesions in the pia mater, which we discovered the following day, existed at that time. Several times also the patient fell into a state of coma, which is considered as appertaining to inflammation of the meninges covering the lower surface of the brain ; and this coma was also moveable as the delirium. The sight also went and returned. Was it not strange that these functional disturbances were but transient, whilst the lesions causing them were permanent? In such a case it must be admitted that these symptoms depended less on the cerebral membranes themselves than on the way in which the cerebral pulp was affected at different periods of the disease by the irritation of the membranes enveloping it. Thus in pericarditis the variability, mobility, and oftentimes also the transient nature of the symptoms, depends on this, that the heart in all persons, or in one and the same person, during the entire course of the disease, is differently affected by the irritation of its investing membrane. — No alteration in the pulmonary parenchyma, nor in its investing membrane, accounted for the very great disturbance of the respiration that was observed. — The symptom, as also the vomiting that took place, must have depended on the cerebral affection.

Case 12.—Abuse of spirituous liquors—Pleuro-pneumonia at the outset—Febrile delirium—Employment of opium in a large dose—Purulent infiltration of the subarachnoid cellular tissue of the convexity of the hemispheres.

A coachman, forty-eight years of age, addicted very much to alcoholic liquor, was received into the *La Charité* on the 25th of September. He then complained of a pain below the left mamma. On the posterior and inferior part of this side, a well-marked crepitating rattle was heard, and the sound in this part also was dull.—The patient coughed frequently, and expectorated transparent viscid sputa, which were slightly streaked with blood. He had considerable fever. Three days previous, this person, being till then in good health, was seized with a violent shivering; then pain of side, oppression, and cough became manifest. These symptoms of pleuro-pneumonia were met by bleeding from the arm to sixteen ounces, and the application of twenty leeches to the side, which was done immediately after the bleeding. The blood taken from the veins exhibited the buffy coat. On the following day there was an evident amendment. On the night of the 26th the patient was suddenly seized with delirium. On the 27th, the delirium still continued; the general symptoms of pleuro-pneumonia were gone. Fever still. He was bled to twelve ounces; blood buffed.

His state on the 28th still the same (thirty leeches to the neck). On the 29th, delirium still continued. Guided as well by the existing symptoms, as also by knowing the previous habits of the patient, we began to suspect that the case was one of delirium tremens; we determined to try opiates, and ordered ninety-six drops of Rousseau's laudanum to be given in two doses. He took the first without any perceptible effects; in two hours after he took the other, and soon fell into a tranquil sleep till the following morning. He awoke at the visiting hour, and answered, with precision, the questions addressed to him, and again fell asleep; he awoke in the afternoon in the full possession of his reason. On the 1st of October there was considerable fever, which was accounted for by pulmonary engorgement, detected in the posterior and left side of the chest, the crepitating rattle being distinctly heard here; the use of opiates was suspended. On the 3d, the crepitating rattle was still heard, and in the evening the fever was much increased. On the 4th, the pulse very frequent, and a tendency to delirium reappeared; two blisters to the legs. However, in the course of the day, all tendency to delirium disappeared, and the pulse became less frequent. For three days following the intellect became sound, and every thing so favourable, that he appeared likely to be able to leave the hospital very soon; when, on the 9th, his intellect again became disturbed, and the pulse was somewhat accelerated; upon which, an anodyne potion, containing a scruple of laudanum, was prescribed; two blisters were applied to the thighs, and sinapisms to the lower extremities, but without any benefit. On the 17th, 18th, and 19th, the delirium became complete. On the 20th, the tongue, for the first time, lost its natural appearance; it became red and somewhat

dry. The seven days following, continual delirium, increasing prostration; tongue dry and brown; fæces passed involuntarily; pulse frequent and small; rapid emaciation of the face. He died on the 27th of October.

Post-mortem. — A turbid milky serum infiltrated the sub-arachnoid cellular tissue of the convexity of the hemispheres in considerable quantity. The lateral ventricles contained but a small quantity of limpid serum. In the thorax, cellular bands closely united the pleura costalis, and pleura pulmonalis of the left side. A great quantity of frothy serum gushed out of the tissue of the two lungs; this tissue also retained the impression of the finger like an œdematous limb. The pericardium adhered closely to the heart by a dense cellular tissue, whose formation must have been anterior to his entering the hospital. Nothing particular in the abdominal viscera, except that the splenic portion of the stomach was considerably dilated, and the pyloric portion contracted.

Remarks. — When the patient entered the hospital he presented all the symptoms of pleuro-pneumonia, except the characteristic sputa, which were wanting, as sometimes happens. Active antiphlogistic treatment soon dissipated all the symptoms except the crepitating rattle, which was still heard. Delirium then set in, which was met by venesection, leeches to the neck, and revulsives to the lower extremities. To relieve this state, one hundred drops nearly of Rousseau's laudanum were administered, a mode of treatment oftentimes found beneficial where delirium comes on suddenly, in the course of another disease, in persons habitually addicted to ardent spirits. The result was favourable; the patient obtained calm sleep, from which he awoke with his intellect quite sound. — All fever also disappeared; he now seemed convalescent. Again, however, without any known cause, the delirium and fever returned, and an opiate was again employed; but whether from its being given in too small a dose, or that the functional disturbance was now beyond the reach of opium, the cerebral symptoms continued to become worse, and, seven days after their reappearance, the patient died.

It was not probably during these seven days that the morbid alterations in the meninges were formed. The pia mater had certainly been the seat of inflammation. Was it so, when the delirium ceased so readily after the first opiate was given? We know that opium has, under ordinary circumstances, the property of exciting cerebral congestion, or, at least, that it produces symptoms which are accounted for by such congestion. We know nothing positive regarding the nature of the lesion existing in the brain, or its membranes, on the first appearance of the delirium; nor is it necessary to believe, that congestion is necessary to produce such a symptom: as we know from the *post-mortem* examinations of several who, during life, had the same symptoms as this individual, and yet no lesion was found to account for them. We think, that in such cases, there supervenes, in the nervous substance, a modification,

whose anatomical sign escapes us, which precedes either the congestion, or the other alterations, which constitute the anatomical characters of encephalitis or meningitis. May not opium, which is mischievous when once the congestion is established, be then administered, inasmuch as, the brain not being in its normal state, the opium loses the power of producing congestion in it? We think it likely that, if the opium had been administered the second time in as large a dose as at first, on the reappearance of the delirium, it would have again succeeded in removing the nervous symptoms.

Case 13.—Serous cyst developed in the pia mater—Great quantity of turbid serum in this membrane—Hemiplegia at the age of eight years, which completely disappeared at puberty—Atrophy and debility of the limbs formerly paralysed—Cancerous ulcer of the stomach.

This was the case of a man seventy-two years old, who, at the age of eight years, was struck with paralysis of the limbs of the left side, which remained till puberty, and then gradually disappeared; these limbs continued, for the remainder of his life, much less developed and feebler than those of the opposite side. He also usually experienced in them a sensation of cold. For the last four years of his life his digestion became very much deranged, and he lost all appetite, and without any pain of head or any other part, he gradually wasted away, and died in a state of extreme emaciation.

Post-mortem.— The sub-arachnoid cellular tissue of the convexity of the hemispheres was infiltrated with a considerable quantity of turbid serum, and on removing the membranes, the circumvolutions of the two hemispheres appeared farther separated than ordinary by the great quantity of fluid filling up their anfractuosities. Near the great interlobular fissure, towards the middle part of the right hemisphere, there was found in the midst of the sub-arachnoid cellular tissue, a serous cyst, about the size of a small apple, which depressed the cerebral substance beneath it. An enormous quantity of frothy colourless serum flowed from the right lung when cut into. The mucous membrane of the stomach presented, at the distance of about three fingers' breadth from the pylorus, a rounded ulcer, about five inches in diameter, the edges of which, formed of mucous membrane, were of a livid red colour. In two or three places the parietes of the stomach were perforated by this ulcer, and the pancreas was exposed.

Remarks.—The serous cyst developed in the pia mater, was here no doubt the result of the lesion which had been in his early life the cause of the hemiplegia in this individual. There was no disturbance of the intellect observed at any period of the patient's life, which circumstance may be accounted for by the slow manner in which the effusion took place.*

* The fourteenth case given by Andral resembled the above very much, with respect to the anatomical lesions found in the encephalon, except that instead of one there were several cysts discovered. Yet the symptoms differed consi-

CHAPTER II.

DISEASES OF THE MENINGES OF THE LOWER SURFACE OF THE BRAIN.

Case 15.—Purulent infiltration of the pia mater covering the lower surface of the brain—Turbid serum in the inferior occipital fossæ—Delirium at the commencement of the disease; subsequently profound coma—Pulmonary tubercles.

A tailor, twenty-seven years old, had been for three weeks in the hospital, with all the symptoms of advanced phthisis, when one morning we were struck with the indistinctness of his answers; in fact, he seemed as if drunk. The pupils were strongly contracted, and there was great febrile disturbance; on the following morning he presented the following state; head turned backwards, nor could it be brought forward, without eliciting screams from the patient; pupils very much contracted; makes no answers; occasionally raves; some froth at the mouth; teeth closed as in trismus; pulse more than one hundred and twenty; skin hot (two blisters to the legs). For the four following days the retroversion of the head, and the closing of the jaws, disappeared; the two pupils remained contracted; on raising the eyelids, we thought the sight quite gone; he seemed plunged in a profound sleep, scarcely drew back his limbs when pinched. Pulse now but of moderate frequency; skin not very hot, was almost constantly covered with abundant perspiration. The tongue never changed from its natural appearance. The coma however became more and more profound; the respiration became embarrassed, and the patient expired as in a state of apoplexy.

Post-mortem. — We found the entire lower surface of the cerebral hemispheres covered by a thick layer of concrete pus contained in the pia mater; it was found in great quantity, particularly in the fissure of Sylvius, and around the *thalamus* of the optic nerves.— Five ounces at least of milky serum were effused between the cranium and lower surfaces of the cerebellum. Numerous tubercles in different states existed in the lungs.

Remarks. — One could not have announced from the symptoms during life, that the membranes at the base of the brain were the exclusive seat of the disease, as nearly similar symptoms were observed to exist in cases where the meninges of the upper surface were engaged. MM. Parent du Chatelet and Martinet have given coma as the distinguishing characteristic of meningitis of the base. But this symptom has been observed in cases where the meninges of the convexity were affected. The absence of headache could not be accounted for by the seat of the affection, as the same absence was

derably, the intellect being disturbed in the latter case, whilst the power of motion was affected in the other. May this diversity of symptoms, he asks, be explained by the difference in the intensity of the pressure to which the brain was subjected in the two cases? — Tr.

observed where the membrane of the convexity was the seat of inflammation. Neither can the contraction of the pupils be converted into a sign, as in diseases precisely similar, both in their seat and apparent nature, the pupils have been observed sometimes considerably dilated, sometimes strongly contracted, and sometimes in the natural state; and occasionally contracted on one side and dilated on the other. Acute meningitis is very rarely observed to accelerate the death of phthisical patients. Some of them, to be sure, become delirious a little before death; but no lesion of the brain or its membranes has been detected to account for this symptom.

Case 16.—Intense headache with vomiting at first—Tendency to sleep, and disinclination to move—Gradual establishment of coma—Natural state of the pupils—Purulent infiltration of the pia mater of the base of the cerebrum and cerebellum.

A labouring man, of middle age and strong constitution, on entering the hospital complained of nothing but violent headache, which commenced five or six days previous, and was for the first two days accompanied with a painful vomiting. The temples were the seat of the pain; they seemed as if compressed in a vice; at intervals he felt acute lancinating pains either at the temples or the occiput, and occasionally the back of the neck became so painful that the patient could not move: he then presented all the symptoms of wry-neck — he felt easy only when perfectly at rest; appetite gone; and what he ate, he said, gave him no strength: since the invasion of the headache had been but once at stool. We saw him first on the 3d of July, when he presented the following state: — Face pale and dejected; look quite vacant; eyes very sensible to strong light; intellect clear; pulse and skin natural. The headache the only important symptom in this case (bleeding to sixteen ounces; sinapisms to legs; purgative clyster); the blood formed into a soft coagulum, with little serum, and no buff. — 4th July. He complained aloud of the violent pain of head; he fancied his skull beaten in as it were with a hammer. Still his forehead was cool, and his face paler than the day before; the pupils, intellect, circulation, natural. Thus the bleeding produced no diminution of the headache — (a second bleeding). On the 5th thirty leeches were applied to the neck. On the 6th headache less; but he answers questions with difficulty; he lies on his back and remains motionless, and resembles a person going to sleep, or whose eyelids are struggling against sleep. He still retains his intellect, but appears to use it in spite of himself; countenance very pale; features drawn, and as it were fatigued. (Two blisters to the legs.) On the 7th he appears in a profound sleep, will not answer questions; when bid he puts out his tongue readily, which remains white and moist. On being pinched he shows that he still retains all his sensibility; pupils sensible to light; pulse sixty; heat of skin natural. — 8th and 9th. Profound coma; he refuses to open his eyes, and appears not to hear the questions put to him; pupils natural; some sensibility still retained (strong sinapisms to the lower extremities). On the 10th, coma

still; complete loss of sensibility; yet, notwithstanding this annihilation of the functions of the life of relation described by the ancients under the name of lethargy, the functions of organic life are still perfect; pulse, temperature of skin, and respiration, natural. On the 12th, for the first time, the respiration appeared affected; sometimes very much accelerated, at other times so slow that the respiratory movement just made seemed not likely to be succeeded by another. On the 13th, respiration still accelerated; in the course of the day the tracheal rattle set in, and the patient died in the night.

Post-mortem. — The upper part of brain and meninges being minutely examined, no morbid appearance was detected; but on examining the lower surface, the pia mater covering it was infiltrated with a purulent layer from seven to eight lines thick.

Chest. — Lungs very much engorged, as the lungs of apoplectic patients, or of animals who die a certain time after a division of the pneumogastric nerves; the right cavities of the heart distended with clots of considerable consistence; the left cavities empty.

Remarks. — In this case and in the preceding the lesions found in the dead body were similar, and had the same seat; yet, how different were the symptoms in both cases! In the latter case, the seat of the headache was far removed from the place where the autopsy detected the lesion. The several bleedings seemed to exercise no influence on the pain in the head; a little after them, the patient, without any previous disturbance of intellect, fell into a state of coma, which every day became more and more profound. Up to the end the pulse continued natural, and it was only towards the termination that the respiration became disturbed, and death seemed the immediate result of the disturbance of this function. The slight disturbance of digestion was but sympathetic. The vomiting, which showed itself at the same time as the pain of head, seemed of the same nature as that which so frequently accompanies the acute hydrocephalus of children, depending equally on disturbance of the nervous centres. The constipation observed in this case is an ordinary symptom when the brain is affected.

CHAPTER III.

DISEASES OF THE MENINGES COVERING THE PARIETES OF THE VENTRICLES OF THE BRAIN.

The cellulo-vascular web extended over the parietes of the lateral ventricles is not visible in the natural state, but becomes so from the effects of disease. Over these parietes may be observed at times large veins filled with blood. We thought this venous engorgement

coincided pretty often with greater or less collection of limpid serum in the cavities of the ventricles. We never observed on the surface of the parietes of these cavities a fine injection similar to that which appears often on the pia mater around the brain. In more than one case we found, in the interior of the ventricles, either limpid serum in great quantity, or even a milky fluid, pus, membranous flocculi, like those of the peritoneum and pleuræ; and in those different cases where there existed within the ventricles so remarkable an alteration in the secretion, the membrane furnishing the morbid product did not itself present any appreciable alteration. These ventricular meningeal inflammations are very seldom found to exist separately; they most frequently co-exist with meningitis of the base or convexity of the brain, and their symptoms are confounded with those produced by inflammation of the meninges of the other parts of the encephalon. The following cases may be interesting as rather uncommon instances of isolated ventricular meningitis.

Case 17.—Sero-purulent effusion into the cerebral ventricles—Cystitis—Violent pain of head at the commencement, afterwards delirium, coma, tongue dry, retention of urine.

A man, twenty-nine years old, a saltpetre maker, residing in Paris for the last eight months generally enjoying good health, and regular in his habits, awoke on the morning of the 21st of December with a violent headache, feeling of lassitude, aching of the limbs and anorexia. This state of general uneasiness continued during the following days. He still continued to work till the 27th, when, feeling himself becoming feebler, he kept his bed. On the 31st he entered *La Charité*, when he presented the following state:—

Countenance pale, features drawn, and as if harassed, eyelids weighed down, air of stupor; violent pain of head, particularly at the forehead, and extending sometimes to the rest of the head; power of motion free; muscular strength still considerable; tongue red and dry; some thirst; disgust for every kind of food; slight pain in the epigastrium, constipation, pulse frequent and tolerably full, skin hot and dry, tumour in the hypogastric region formed by the bladder distended with urine.—(Bloodletting, blister to one leg, purgative enema.) On the following day the state of the patient the same; no stool; the blood drawn presented a soft coagulum without buff. On the 3d, prostration, and air of stupor increased; answers slow and difficult; constantly complains of headache; paralysis of bladder continued, which rendered the frequent introduction of the catheter necessary; tongue moist; pressing on abdomen caused pain, which might depend on the distension of bladder; still constipation; pulse yet frequent and full (sixteen leeches to neck, twelve grains of Dover's powder, purgative enema). On the 4th no amendment; skin still dry; tongue red, and again becoming dry; the enema had no effect; bladder very much distended (leeches again, and Dover's powder, lemonade, with a little wine added).

On the evening of the 5th became delirious, and on the following morning he uttered constant complaints; he said he no longer had pain of head; stupor more marked; tongue red and dry; one stool; urine very abundant, and still drawn off by the catheter. On the 7th, acute pain of head; tongue quite dry; pulse frequent, and of considerable strength; skin dry and hot; thirst; delirium. On the 8th, profound coma; eyes closed; mouth half open; answered no questions; felt pain when abdomen was pressed; when the skin of one of the extremities was pinched he drew it back, and face assumed an expression of pain. The two arms, when raised, fell back as inert masses; respiration occasionally full and hurried; then became slow, and the respiratory movements succeeded each other at long intervals. The respiratory murmur not blended with any rattle, and its intensity not in proportion to the considerable raising of the thoracic parietes. Pulse one hundred and twenty, and the intervals of the pulsations unequal. Some subsultus in the tendons of the muscles of the forearm; great quantity of urine. In the course of the day the intermissions of the respiration became more and more considerable; at last it stopped altogether, and the patient expired.

Post-mortem. — Several veins in the subarachnoid cellular tissue of the convexity of the hemispheres gorged with blood. On making an incision into the upper wall of each lateral ventricle, an immense quantity of milky serum flowed out, in which some albuminous flocculi floated. On slightly touching the internal wall of each of the ventricles, from the ancyroid cavity to the anterior extremity of their inferior portion, the cerebral substance was found very soft for the space of one or two lines, and seemed as it were diffluent under the finger.

Thorax. — Nothing particular.

Abdomen. — A great quantity of liquids distended the stomach. We observed on its inner surface two red spots, one the size of a five-sous piece, and the other that of a twenty-sous piece. In the large intestine, veins were seen in considerable numbers in the mucous membrane of the cæcum. The mucous membrane of the bladder exhibited a bright red injection in its entire extent; and in several parts it was covered with a purulent exudation.

Remarks. — This case resembled in many points, with respect to the symptoms, certain cases of typhoid fevers, to be recorded in another portion of this work. The tongue, which we found in its natural state in the cases preceding this, here presented that redness and dryness so common in dothinenteritis; the countenance also presented that air of stupor so characteristic of exanthematous inflammation of the small intestine. There was no other cerebral symptom, properly speaking, except the delirium followed by profound coma, and even those two symptoms appeared only during the last two days. Pulse was constantly frequent, and the skin presented that dryness so often accompanying acute inflammation of the intestinal follicles, to which part, in fact, one would for many reasons

be inclined to refer the seat of the disease, and the cause of the continued fever. Yet the *post-mortem* disproved this; what we found being a sero-purulent effusion into the lateral ventricles, with a superficial softening of the cerebral substance of a portion of their parietes. We also found remarkable lesions in the bladder, its mucous membrane being every where red, and a purulent layer covering it. Was then the retention of the urine in this case connected with cystitis? or was the latter the result of the repeated introduction of the catheter? If we now recur to the commencement of the disease, we shall find that it began with headache, a symptom, the frequent, though not necessary existence of which we have also observed in meningitis of the base, as well as in that of the convexity of the cerebral hemispheres. This having been the first symptom, we had certainly some reason for suspecting the brain or its membranes to be the part affected, yet we could not have been certain of it, particularly when we recollect pain of head similar to this, to have ushered in and accompanied as the leading symptom, different cases of dothinenteritis. Shall we take into account, in order to establish our diagnosis, the remarkable state of the respiration towards the close! Frank, in fact, has given, as one of the characteristic signs of encephalitis, those long intermissions of the respiration: in this disease, he says, the patient respires deeply, and at long intervals; *Spiratio magna ex longis intervallis ducitur.* But the same state of the respiration has been found in several cases of dothinenteritis, without any appreciable lesion of the brain after death.

Case 18.—Sero-purulent effusion into the lateral ventricles—Granular appearance of the membrane lining their parietes—Alternation of delirium and coma: of stupor and violent agitation; of abolition of muscular contractions, of strong tetanic twitches—Pulse occasionally rare and frequent.

A lapidary, twenty-one years of age, was admitted into *La Charité* on the 20th of April, 1820. What particularly struck us then, was his air of dejection; he kept his head under the bed-clothes, and refused to answer questions; he merely told us that, for several days he had, over the entire abdomen, pains which were not increased by pressure, and that for a considerable time he had no stool; pulse not frequent. The nature of the abdominal pains, the constipation and apyrexia, together with the circumstance of his being a lapidary, caused us to suspect lead colic. The ordinary treatment of the hospital for this affection was accordingly adopted.

On the 21st, skin hot; pulse frequent; the treatment of the preceding day discontinued. Diluent drinks prescribed.

From the 21st to 26th, the fever continued; the air of sadness still remains; slight abdominal pains; constipation still; tongue natural (drinks continued; purgative clyster; linseed cataplasms over the abdomen).

On the 26th, patient lay on his back, his look being fixed; the two pupils a little contracted, the right less than the left; head somewhat turned back. He refused to answer questions, and talked

incoherently; several times in the night he attempted to escape out of bed, so that restraint became necessary. Tongue natural; pulse frequent (two blisters to the legs).

On the morning of 27th, profound stupor; patient performs no motion whatever; abdominal pressure gives no pain; pulse lost its frequency; heat of skin no longer raised; constipation still continues — (eight leeches behind each ear; two blisters to the thighs; mineral lemonade).

On the 28th, comatose state quite gone; he puts out his tongue when asked, but gives no other signs of intellect; utters not a word; pupils a little dilated; tongue natural; no stool; apyrexia (purgative enemata, &c.).

29th, No change; but on the 30th agitation and delirium as on the 26th; constantly rubbing his hands together; belly tympanitic; pulse not frequent; tongue moist and pale (twenty leeches to neck; twelve grains of calomel).

1st May, delirium continues, retroversion of the head; carphology; pupils dilated; pulse very frequent; abdomen tympanitic (twelve grains of calomel; frictions to the abdomen, with linim. ammon. camphor., and aromatic fomentations to the same part).

2d May, delirium continues, as also the carphology; continual tossing of the head alternately from right to left, and *vice versa;* moaning; sudden shocks of the trunk and limbs, like those of tetanus; carotids beat strongly; the heart raises the parietes of the thorax; tympanitis considerable. Death at eight o'clock at night, after discharging a considerable quantity of blood from the nose and mouth.

Post-mortem. — On a level with the *centrum ovale* of Vieussens, on each side of the *corpus callosum*, we perceive a manifest fluctuation; an incision made into the lateral parts gave exit to a considerable quantity of liquid, like whey not clarified, in the middle of which albuminous shreds are seen to float. From the surface of the parietes of each ventricle, a very thin membrane is detached, which is traversed by very minute vessels curiously injected. On some points of the free surface of this membrane, small greyish bodies exist, the size of a pin's head, like the rudiments of false membranes, which, under the form of granulations, are sometimes scattered over the peritoneum.

Thorax. — The pleura costalis and pulmonalis adhere by well organised cellular tissue. The lung of this side contained a great number of tubercles, principally miliary, some were larger, and softened. The bronchi of this lung were very red, and the bronchial ganglia hard and black. The left lung also adhered to the pleura, but contained not a trace of tubercle. The two serous folds of the pericardium were internally united to each other by a false membrane several lines in thickness.

Abdomen. — The anterior wall of this cavity projected considerably before the thorax; when struck it sounded like a drum. The intestines were enormously distended with gas; stomach contained

a great quantity of mucus, and the small intestine a great quantity of bile. In the cæcum and colon, ascending as well as transverse, the mucous membrane was very much injected. The left lumbar colon, filled with very hard fæcal matter, was white on its internal surface, as was the sigmoid flexure and the rectum; above this last intestine was a very marked circular contraction. The gases and fæces accumulated in the colon could with difficulty get through it; rectum empty.

Remarks. — In this patient the nervous symptoms were much more marked and varied than in the preceding. In both, the cerebral lesion was of the same nature and had the same seat. In the latter case, as in the former, the lesion discoverable by anatomy existed only in the lateral ventricles. With this inflammation of the ventricular membrane coincided different symptoms, some of which are generally regarded as characterising meningitis of the convexity of the hemispheres, and others more especially connected with meningitis of the base; thus on the one hand there was delirium and frequent tossing, on the other a state of coma. We often see these two orders of symptoms replace each other, and at the same time there are observed very remarkable disturbances in the muscular contraction, characterised by shocks of the trunk and limbs like those of tetanus, and a forcible reversion of the head. If we refer to the period when we first saw the case, we shall again find some phenomena worthy of remark, connected with the nervous system. The profound sadness of the patient then, that air of dejection, and disposition to conceal his head under the bed-clothes, as if to avoid our look and questions, his reluctance to answer, &c., were certain indications of a commencing cerebral affection. This state of the patient prevented us unfortunately from procuring any information as to what he had suffered before he came to hospital — as, for instance, whether he had had pain of head. The tongue was constantly natural, not so in the preceding case; and yet the primæ viæ were here affected; for at different times, and especially on entering the hospital, he complained of acute pain in the abdomen, and had most obstinate constipation. Had he the beginning of lead colic? We must not lose sight of the bright red appearance found in a great portion of the large intestine, and the accumulation of fæces in the sigmoid flexure, which a circular contraction of the commencement of the rectum prevented from passing into the latter intestine. This contraction depended on no organic lesion; it appeared to be the result of a spasmodic affection of the muscular coat.

Case 19.—Serous effusion into the cerebral ventricles—Pain of head at the commencement—Subsequently coma—Acceleration of the pulse some hours only before death.

A mason, twenty-three years of age, had been complaining for several days of violent pain of head, when he entered the hospital. Tongue white; pulse not frequent: no other ailment than the headache. Two grains of tartar emetic were given him. He vomited twice very copiously, and had two stools. The following day the state of the patient underwent a remarkable change. His intel-

lect very much diminished; he answered questions slowly and with difficulty. Still complained of the headache; pulse and tongue natural. (Twelve leeches behind each ear.)

On the 17th. Great stupor. On being very much solicited, he opened his eyes slowly, and looked around him with the most vacant stare. On being asked how he found himself, he answered, that he was doing very well. Pupils did not contract on the approach of a very strong light; they were not much dilated, the right a little less so than the left. State of pulse and skin natural. (Six leeches to each mastoid process; a pint of whey, with the addition of a grain of tartar emetic, and four drachms of sulphate of soda; two blisters to the thighs; frictions with linim. volat. cantharid. to the extremities.) 18th. Stupor continues; utters some unmeaning words; puts out his tongue when asked; pupils more dilated than on the preceding day, and equally so; pulse has acquired some frequency; tongue dry; bladder very much distended — (a pint of whey, with a grain of tartar emetic, and an ounce of sulphate of soda; frictions with linim. ammon.). During the day the coma increased, and he died during the night.

Post-mortem. — The two lateral ventricles were found to be very much distended with limpid serum; some was also found in the third ventricle. Nothing remarkable was observed in the other cavities.

Remarks. — The symptoms here did not differ much from those in the seventeenth and eighteenth cases, in which pus was found to fill the ventricles. There was no febrile excitement at all in the course of the disease, and it was only a few hours before death that the pulse became accelerated.

Case 20.—Copious serous effusion into the lateral ventricles—Destruction of the fornix and septum lucidum—Symptoms of apoplexy.

A man, fifty years of age, entered *La Charité* with considerable anasarca and ascites: no local sign of organic disease of the heart; respiration free; states that he never felt any pain in the right hypochondrium; the dropsical effusion took place three months previously, but we could not learn from him where it commenced; digestion well performed; no new symptom presented for the fifteen days following. One morning, on approaching his bed, we found him in a state of apoplexy, totally deprived of consciousness. We were told that since the evening before he had not spoken; face pale; eyes appeared deprived of sight; both pupils sensibly dilated; the extremities when raised fall as inert masses; total insensibility; pulse not frequent; respiration hurried and stertorous; tracheal rattle very loud. He died some hours after the visit.

Post-mortem. — Considerable serous infiltration of the upper and lower extremities.

Cranium. — A small quantity of limpid serum infiltrates the subarachnoid cellular tissue of the convexity of the brain. The two lateral ventricles were confounded with the third into one enormous

cavity, from which there flowed two glasses full, at least, of serum clear as spring water. In the place of the *septum lucidum* and *fornix*, there was nothing but small fragments of a white pulp floating amidst the serum.

Thorax. — Lungs very much engorged; in other respects sound. In the heart, which was natural in every respect, and in the rest of the arterial system, there was found but a very small quantity of blood, remarkably liquid. Some liquid blood, and that in small quantity, was all that was found in the veins.

Abdomen. — The peritoneum contained several pints of limpid serum. The liver, which was of the ordinary size, was remarkable for its great hardness — as also the spleen.

Remarks. — Here again we have a considerable effusion of serum into the ventricles, together with a breaking down of the central white parts of the brain. We are disposed to consider the destruction of the *septum lucidum* and the *fornix* as the mechanical result of the pressure made on them by the fluid in each ventricle. In the two cases preceding we have seen, notwithstanding the identity of the lesions found after death, that the symptoms were far from being similar. Here again we have the same lesions, and the symptoms were those of *apoplexy*, that species of it usually called *serous apoplexy*. Dropsy, of which the cause was obscure, was the only disease the patient laboured under up to the apoplectic attack; and, to account for this dropsy, we found no other lesion, except the morbid state of the liver. There existed already, then, in this individual, a disposition of long standing to serous effusions; when suddenly, no doubt, the serous membrane, lining the cerebral ventricles, exhaled a large quantity of serum, which caused all the symptoms of real apoplexy. Thus we have sometimes seen in dropsical patients great dyspnœa suddenly supervene, and death follow after some hours the constantly increasing difficulty of respiration. It was accounted for by a serous effusion which took place all at once into both pleuræ. In the present case the anasarca and ascites did not diminish when the effusion into the cerebral ventricles took place. In another individual, whose history shall be given elsewhere, both the anasarca and ascites were considerably diminished before the appearance of the apoplectic symptoms, which, as in the present case, were produced by a sudden effusion of serum into the cerebral ventricles.*

* A case somewhat similar occurred in Dublin, about three years since, under my own care. It was that of a man of very intemperate habits, whose liver was considerably enlarged; he had ascites and anasarca, and was treated in the usual way, without any amendment. One morning when he awoke, he found the size of the abdomen very much diminished, and the swelling of the lower extremities quite gone. He arose from bed at twelve o'clock in the day, sat a few hours at the fire, became drowsy, threw himself on the bed, and when his wife went to call him, at about four o'clock in the evening, she found him dead. The ventricles of the brain were found to be enormously distended with limpid serum. — T.

CASE 21.—Considerable serous effusion into the lateral ventricles, with destruction of the septum lucidum and of part of the fornix—Ossification of the great falx cerebri —Symptoms of apoplexy.

A man, seventy-two years of age, entered the *La Charité* during the month of December, 1821. He had been for a long time labouring under pulmonary catarrh; for the last two months he kept his bed, being very much debilitated. When we saw him, he had some fever; tongue dry and brownish red; a little cough in very distressing kinks, accompanied with the expectoration of puriform mucus; intellect sound. He was ordered pectoral drinks, which he continued to use for fifteen days, when suddenly he lost all consciousness; his eyes closed; the four extremities lost the faculties of sensation and motion; sensibility gone; on raising the eyelids we might touch the conjunctiva without his feeling pain; the pupils were dilated and immoveable; the pulse retained some strength and considerable hardness, but had lost its frequency; the skin was covered with a copious sweat; each inspiratory movement was accompanied with a loud tracheal rale. Death took place the following night.

Post-mortem. — *Cranium.* — More than an ordinary glass full of water filled both lateral ventricles; no trace of the septum; in place of the middle part of the *fornix*, we found a white pulp, which was raised with the scalpel from the upper surface of the choroid plexus. The great *falx cerebri* ossified.

Thorax. — Considerable infarction of the lungs. On cutting into them, a considerable quantity of frothy, colourless serum flowed from their tissue. Slight hypertrophy of the parietes of the left ventricle; numerous incrustations on the inner membrane of the aorta.

Abdomen. — A viscid mucus covers in considerable quantity the inner surface of the stomach; beneath it a bright injection of its mucous membrane towards the great curvature, as also of the small intestine.

Remarks. — This is a well marked case of what is called *serous apoplexy* coming on in an old man, exhausted by chronic irritation of the gastro-pulmonary mucous membrane. In this, as in the preceding case, the patient lived but a few hours after the first symptoms of apoplexy, during which the pulse retained its hardness, but became very slow; the slowness depending on the serous effusion into the ventricles of the brain, and the hardness of the pulse on the commencing hypertrophy of the parietes of the left ventricle.

CASE 22.—Sanguineous congestions in the brain, terminating in serous effusion into the lateral ventricles.

A woman, fifty-one years old, of a sanguine temperament and strong constitution, ceased to menstruate about her forty-ninth year; during the six months following she was subject to a numbness in the right arm. In her fifty-first year she suddenly lost consciousness, fell, and retained, when she came to herself, some difficulty in her

speech, with some falling of the commissure of the lips and tongue on the right side, considerable diminution of motion and sensation on this side, nausea and bilious vomiting. Under proper treatment this state disappeared at the end of four weeks. After this the patient returned to a perfect state of health, when towards the middle of March, 1819, she again began to feel a little weakness in the right arm; slight pains of head in the frontal region soon supervened, and, on the 26th of April, without any obvious cause, there came on in the night, during sleep, a new attack, more violent than the former, and of the same side; total loss of speech; considerable diminution of sensation, but particularly of motion, in the extremities of the right side; features not altered; tongue fell a little on the right side. This new attack disappeared, however, more promptly than the preceding, and at the end of three days, the patient having entered the hospital, presented the following state: — She had slept well the previous night; some weight of head; tongue unsteady when she puts it out; some numbness and weakness on the right side of the body; speaks distinctly; pulse full, strong, and slow; habitual constipation (lemonade with cream of tartar; fifteen leeches to each foot; warm pediluvium; purgative enema). In the morning she took some soup, and was seized with vomiting in the course of the day, when she threw up some bile. The vomiting brought on a new attack, followed by an increase of the hemiplegia on the right side and greater embarrassment of speech. She was bled to ten ounces. New attacks of a slight nature appeared in the night, upon which sinapisms were applied to the feet: after this the fæces passed involuntarily. On the 30th, hemiplegia more developed; articulation nearly impossible; pulse less full, less hard, and more accelerated; paralysis of the bladder (lemonade with one ounce of soluble tartar; bleeding from the jugular vein; purgative enemata; introduction of the catheter). Immediately after the bleeding (ten ounces) a new attack, followed by total loss of speech, and of motion in the right extremities; frothing at the mouth; dilatation of the pupils; countenance quite vacant. On the following morning these symptoms were all aggravated; trismus also supervened, which prevented her from drinking, and constant drowsiness. On 1st of May, pupils immoveable, blindness, trismus, frothing at the mouth at each expiration; contractility abolished on the right side, almost none on the left; a little sensibility on both sides, rather more on the left; pulse full, hard, irregular for the number of pulsations (twenty leeches to the neck; blister to legs; purgative enemata). She died a little after the visit.

Post-mortem. — *Cranium.* — The lateral ventricles contained nearly four ounces of limpid serum; no lesion in the thoracic or abdominal viscera.

Remarks. — The apoplectic attacks in this case seem to have been produced by simple sanguineous congestions in the brain. It would appear that here the hemiplegia was the result of a sanguineous congestion greater in one hemisphere than in the other, whereby this

hemisphere lost its influence over the muscular contractility, even when the congestion ceased to exist. The first time the hemiplegia was preceded by a total loss of consciousness; the second time it was gradual, and not announced by any symptom of apoplectic attack. The more alarming symptoms observed for the last two days were the result of serous effusion into the ventricles, of which the habitual sanguineous congestions had been probably a predisposing cause. We should not forget to notice here the influence of the vomiting on increasing the hemiplegia.

CHAPTER IV.

CASES WHEREIN THE ENTIRE OF THE MENINGES WERE INVOLVED.

Case 23. — A man, fifty years of age, naturally of a strong constitution, having been very unsuccessful in his commercial speculations, came to Paris, where, after residing for some time, he became affected with general debility, which went on daily increasing. At last he entered *La Charité* on the 11th November, 1821. During the first two or three days he scarcely appeared ill in any way; but was plunged into a profound melancholy. On the 15th, he complained of total aversion to food; his tongue was covered with a thick yellow coat; abdomen free from pain; no fever. During the day he took twelve grains of ipecac. and vomited abundantly. On the following day he seemed better. On the 17th, however, the pulse had become frequent; tongue showed a tendency to become dry; he vomited his drinks; his bladder, distended with urine, formed a tumour above the pubis; he explained his state perfectly; he was still more sad and taciturn than usual (the urine was drawn off; linseed clysters). 18th. Same state of bladder; countenance exhibits great stupor; still the intellectual and sensorial faculties unimpaired; patient complains only of great debility; tongue moist and foul; no stool; pulse scarcely frequent; skin not hot — (enema of marshmallow with a scruple of camphor; frictions on the extremities with linim. volat. cantharid.). 19th. In the same state. 20th. Prostration greater; he lies on his back quite motionless, with his eyes turned up and fixed; he appeared indifferent to every thing passing around him; answers questions precisely, but slowly; pulse frequent; skin hot; tongue still moist (six leeches to the anus; camphor enema, lemonade). On the 21st, for the first time, he complained of headache, without being able to point out its precise seat; though he answered questions, still his mind was disturbed at intervals; his eyes were constantly directed towards the roof of the bed, except when he was spoken to; tongue, which was very yellow, again showed a tendency to become dry; abdomen was tympanitic,

and since the preceding day the feces passed involuntarily — they were liquid; pulse very frequent and compressible (four leeches behind each ear; fomentation with camphorated oil of camom. to the abdomen; sinapisms to the lower extremities; infus. quinquin. &c.). In the course of the day the fæces passed involuntarily twice; raved all the night. On the 22d, stupor more marked; eyes, which were directed towards the roof of the bed, were occasionally closed; mouth half open; no answer could be elicited from him; tongue very dry, and a dark yellow; abdomen again soft; on pressing it strongly the respiration was very much accelerated; pulse ninety-eight, very small, and very irregular; the skin covered with an abundant sweat. On the 23d, eyes dull, features quite altered; pulse one hundred, and thready; skin still hot and moist; passed no urine for the last twenty-four hours. He died in the course of the day.

Post-mortem forty-six hours after death — Cranium. — Considerable injection of the membranes over the entire convexity of the cerebral hemispheres. Towards the anterior extremity of the inner surface of these hemispheres, the arachnoid was raised on both sides by a purulent layer, which was displaced, but not removed, by passing the back of a scalpel over this membrane. The pia mater was infiltrated with pus through the entire extent of the fissure of Sylvius on the right side; a layer of this same liquid was found on the upper surface of the two lobes of the cerebellum. The upper wall of each of the lateral ventricles was very much raised, and presented an evident fluctuation. Each lateral ventricle contains, in fact, a greyish liquid, in the midst of which numerous flocculi float: these also accumulated in the lower part of the ventricles, form a thick layer which covers the *cornu ammonis* on each side. Some whitish laminæ were also found on the lower surface of the cerebral hemispheres. Thus surrounded on all sides by a layer of pus, the cerebral substance underwent no appreciable alteration, not being even injected.

Thorax. — Anterior part of the two lungs empty of blood, whilst the posterior portion was gorged with it. The left cavities of the heart empty; the right cavities contain a small quantity of liquid black blood. In the thoracic aorta is a fibrinous clot divested of colouring matter. The vena cava in the abdomen full of liquid black blood.

Abdomen. — The convolutions of the small intestine were distended with gases; the transverse colon also contains a great quantity of them. The stomach, which was covered by the colon and the liver, was distended with a mixture of gas and liquid in its splenic portion, whilst it was contracted in its pyloric extremity; the inner surface of the stomach of a brownish grey, through the whole extent of the great curvature; the duodenum, and two upper thirds of the small intestine, contained a great quantity of a yellow, viscid liquid, which colours very deeply the internal surface, and particularly the valvulæ. This portion of intestine, when washed, presents no

appearance of injection. The lower third of the small intestine contains a greenish matter more liquid, but not viscid; its inner surface is pale, except in three places, where there is observed a deep red colour, the seat of which is in the mucous membrane. Here we found three patches forming a slight projection above the level of the rest of the mucous membrane, each of them being about the size of a five-franc piece. For the extent of four fingers above the ileo-cœcal valve, the mucous membrane was uniformly injected. The large intestine contains a greenish liquid; its inner surface presents through its entire extent a slight injection of the mucous membrane. The liver is remarkably large; it extends into the left hypochondrium, and is interposed between the abdominal parietes and the spleen, to which it is united by cellular adhesions; its tissue is, in some degree, gorged with blood; it presents a red ground, traversed by numerous white lines. Spleen large and very soft. The bladder, which is contracted, contains not a drop of urine, and its mucous membrane is injected, and on one part of it there is a small eschar.

Remarks. — The group of symptoms presented by this individual bear much closer resemblance to those appertaining to a severe dothinenteritis, than to those connected with acute meningitis. On the dead body we found the latter very much developed; but there were also indisputable, though very slight traces of a morbid state of the intestinal follicles. It was certainly on their inflammatory engorgement that those three red marks depended, which projected above the level of the intestinal sarface, the existence of which we found not far from the cæcum. We may further observe, that this person had but recently arrived in Paris; on the other hand, he had passed the age at which persons are usually attacked with dothinenteritis. The moral causes which had been operating on him, seemed more particularly to have disposed him to a cerebral affection. In subsequent parts of this work, we shall meet more than one case in every respect analogous to this with respect to the symptoms, in which, however, the nervous centres presented no appreciable lesion after death. A question may be raised, whether this meningitis, so remarkable for its extent and for the quantity of pus effused into the pia mater and the ventricles, was not an additional phenomenon, or a complication, and whether it might not have been absent, and the disease still have retained the same form, observed the same progress, and been attended with the same severity? Several facts, which shall be stated in another place, warrant us in thinking that the question may be answered in the affirmative.

Case 24. — Thickening of the membranes on the convexity of the hemispheres, and at their base—Tubercles in these membranes, and in the cerebral substance itself, which is red and softened around them—Tubercular diathesis—Symptoms of apoplexy at the commencement and termination of the disease.

A man, thirty-three years old, had experienced, five days before entering *La Charité*, all the symptoms of an apoplectic attack; the loss of consciousness continued for twenty hours. On the following

days he continued paralysed on the right side; then delirium supervened, and the patient was admitted into the hospital after having been bled three times from the arm. He then presented the following state: — Face pale; delirium; equal facility in moving the extremities of the right and left side; pulse and tongue natural. On the day after, Feb. 23d, the eighth day of the disease, the delirium still continues; air of restlessness; sinking of the features; pulse hard, still not frequent; tongue white and moist (sixteen leeches to neck). On the 26th, intellect scarcely disturbed; answers slow, but accurate (eight leeches to neck). 27th, Delirium returned; pulse now for the first time has become frequent. 28th, Eight leeches across each jugular vain. On the 2d and 3d of March, delirium complete, with fever (twelve leeches to the neck each day). This state continued with very little change for twelve days following, during which leeches were frequently applied to the neck, when, on the 16th, the patient suddenly fell into a state of the most profound coma; at the time of the visit he seemed like a man who had just had a violent attack of apoplexy. He expired some hours after.

Post-mortem. — *Cranium.* — The arachnoid lining the inner surface of the dura mater readily separates from it; the membrane covering the entire convexity of the cerebral hemispheres is opaque, very white, and several lines thick; the pia mater is the principal seat of this thickening. On the lower surface of the left hemisphere, towards its middle part, we observe in the meninges opaque portions similar in appearance to the meninges of the convexity; but here other peculiarities are also observed; these opaque portions principally exist in the intervals between three or four circumvolutions; the anfractuosity, which should separate them had disappeared, and these circumvolutions closely adhere to one another. On the infiltrated and thickened pia mater, which unites them, there are observed small whitish miliary granulations, of a tubercular appearance, set in order like so many beads. In the grey substance of the adhering convolutions, there appear several of these granulations; around each of them the cerebral substance is very much injected and softened for the extent of some lines.

Thorax. — Similar granulations are also found in great quantity in the substance of the two lungs, and some also in the pleuræ.

Abdomen. — The inner surface of the stomach white, and slightly injected towards the great curvature; a tumour, the size of a nut, projects on the interior of the stomach in the same direction; when cut into it was found to consist of a sac, the raised mucous membrane forming its parietes, and the cavity being filled with softened tubercular matter; this sac communicated with a large tubercular lymphatic ganglion attached to the great curvature of the stomach. The upper portion of the small intestine a little injected; some tubercles were found between the peritoneum and muscular coat of the intestine; the mesenteric ganglia very large. In front of the vertebral column there was found an enormous tubercular mass, consisting of the ganglia which exist ordinarily around the *recepta-*

culum chyli; the same tubercular ganglia are found in the thorax all along the thoracic duct; a large tubercular mass exists also in the fissure of the spleen; other tubercular masses fill up the different furrows of the liver; in the interior of the liver we observed several small round bodies, white, and of considerable hardness, presenting at their centre a yellow point; similar bodies are found in the central part of the kidneys, but without the yellow point in their centre; three or four of these bodies were also found in the pancreas.

Remarks. — This disease, after commencing with all the symptoms of an apoplectic attack, entirely changed its form. The apoplectic phenomena disappeared altogether; not a trace even of the paralysis which followed the loss of consciousness remained. But another scene commenced; and we behold most of those symptoms develop themselves belonging to the disease designated by Huxham under the name of slow nervous fever. On the part of the nervous centres, we detect no other functional disturbance, except that of the intellect, and even that is not permanent. The disease, after lasting twenty-nine days, returned to its original form, and the patient was carried off in a few hours with the symptoms of apoplexy. The *post-mortem* examination presented very remarkable lesions. The state of the meninges of the convexity of the cerebral hemispheres, accounts for the disturbance of the intellect, but it does not explain the alternate increase and decrease of the delirium. The lesions at the base were of the same nature as those on the convexity of the brain. We must not lose sight of those red softenings scattered through the grey substance of some of the circumvolutions, and of those precisely whose investing membranes were also diseased.— Was this part of the brain the seat of the apoplexy, in which the disease terminated? This appears so much the more probable, as the paralysis was on the right side, and it was at the base of the middle part of the left hemisphere that these softened points existed. But why did the symptoms of apoplexy disappear? Why did the paralysis cease? No doubt, because the cerebral lesion, being at first but slight, disappeared of itself. But by reason of the disposition to tubercular secretion existing in this individual, tubercles took the place of the blood that had been effused into the cerebral substance, whilst they were also deposited in the cerebral membranes. At a later period, no doubt a new inflammatory process took place around each cerebral tubercle, and thence perhaps the new attack of apoplexy which carried off the patient.

Case 25.—Pain of head of very long standing—Suddenly delirium; then coma — Symptoms of apoplexy and death Purulent effusion on the convexity of the cerebral hemispheres, at the base of the brain and into the ventricles—Old cellular adhesions of the two folds of the arachnoid—ossification of the retina.

A shoemaker, thirty-eight years of age, of strong constitution, deprived of the left eye from his infancy, was troubled all his life with pains of the head, the seat of which he usually referred to the

left side of the cranium; fourteen months previous he received some violent blows on the head in a fight, since which occurrence his headache became more frequent and more severe; he often feels a dizziness. On the 13th June, after his work, he complained of general illness, and of a more violent headache than ever over the left side of the cranium; during the night he became very feverish. On the 15th he was bled. On the 16th, some delirium at intervals. On the 17th, constant stupor (a blister was applied to nape of neck). On the 18th he entered *La Charitè*, and on the 19th (the seventh day of his illness) he presented the following state: face pale; eyes shut; appearance of tranquil sleep, from which it is almost impossible to arouse him; when he does open his eyes he looks around him with a stupid air, utters not a word; power of motion perfect, but sensibility diminished; passes his fæces under him — (one ounce of sulphate of soda, sinapisms). On the 20th, no change. 21st, pulse accelerated; heat of skin very much raised; still comatose; subsultus in both arms; bled from the arm; blood covered with a thick coat. On the 22d new symptoms were observed; left eyelid remained depressed over the eye; the right eye, on the contrary, wide open, fixed and dull; pupil of this side dilated and immoveable; at each expiratory movement the left cheek was pushed out, announcing commencing paralysis of the muscles of this side of the face. The right arm, when raised, fell again as an inert mass; subsultus in the two forearms. Pinching the skin gives not the least pain; respiration stertorous; pulse frequent and strong; skin covered with sweat. In the course of the day the coma became more and more profound, and the respiration more difficult, and at five in the evening he died.

Post-mortem — Cranium. — Cellular adhesions, similar to those often uniting the pleura, extended from the arachnoid covering the hemispheres, to that lining the dura mater. The pia mater, in the upper surface, very much injected. The lateral ventricles were distended by a great quantity of a whey-like liquid. The meninges of the brain were generally injected. A thick purulent layer, which was seated in the pia mater covering the left cerebral peduncle, the left portion of the medulla oblongata, and extended, like a sheath, over the nerves arising from this part. Nothing remarkable in the thorax or abdomen.

Examination of the left eye. — The transparent cornea was thick and opaque; the opening of the iris was completely obliterated by a white membrane several lines thick, the edge of which adhered to the circumference of the iris; no longer any trace of the crystalline lens. The vitreous humour had a milky appearance. Not a trace of retina, but in its place we found a small bony shell, having a small hole in the centre; its concave surface was applied to the corpus vitreum; no vestige of the ramifications of the optic nerve was discovered on it. The left optic nerve was smaller than the other, and of a grey colour, from the sella turcica to its entrance into the eye; it terminated at the central hole in the bony shell

above described, by a bulb apparently fibrous, and similar to the swelling found in the extremities of nerves in amputated limbs. From their origin to their crossing the two optic nerves were perfectly similar.

Remarks. — In this individual two species of alteration were found within the cranium, and all two had their share in the production of the symptoms. The one of these alterations was of long standing, namely, the cellular adhesions uniting the two layers of the arachnoid. It is very probable, that on these depended the headaches which so long annoyed the patient. Anatomy, however, does not inform us why the pain of the head was more severe on the left than on the right. The exasperation of this pain of head, marked the commencement of the acute disease, for which he entered the hospital, and which was sufficiently accounted for by the purulent effusions found on the upper surface of the brain, its base, and in the ventricles. We may observe, that the purulent layer of the base was confined to one of the cerebral peduncles, the left, and also to the left pons varolii and medulla oblongata. We may also observe the purulent sheath, surrounding the nerves, arising from the left side of this part of the brain. Is it in consequence of these anatomical circumstances that, towards the termination of the disease, the left eyelid, and cheek of the same side, became paralysed, at the same time that all motion seemed extinct in the right arm? Violent pain of head, fever, general illness, were all that we observed during the first days of the disease. Some delirium set in on the 4th, which, on the 5th, was succeeded by a state of coma, which went on increasing to the 10th day, when he died, a little after symptoms of paralysis appeared. To explain this succession of phenemena, shall we say that the meninges of the convexity of the hemispheres were, at first, irritated, and that it was then the delirium appeared, and that the coma which succeeded this delirium, announced the extension of the meningitis towards the base of the brain and into the ventricles? We have already seen, however, that it is not always possible to determine from the prevailing symptoms, what portion of the meninges is especially affected. The circulation did not present that slowness here which it did in other cases. The pulse, which was natural on coming to the hospital, became frequent and febrile, in proportion as the state of coma became more and more developed. We have observed the contrary in the other cases.

CHAPTER V.

DISEASES OF THE MEMBRANES OF THE SPINAL CORD.

Case 26—Spinal arachnitis—Arachnitis of the base and convexity of the brain—Milky serum in the ventricles.*

A woman, twenty-eight years of age, the mother of four children, had been very much distressed by certain insulting proposals made to her; her menses were suddenly suppressed in the midst of their course, and she was instantly seized with violent shivering, which lasted twenty-four hours. The next day, great heat of skin; burning thirst; a sense of squeezing at the throat; bolus hystericus very marked. On the third day, bilious vomiting; she vomited also

* The following very interesting cases, which serve to illustrate the principal circumstances connected with disease of the upper cervical vertebræ, are condensed from Dr. Bright's Medical Reports, vol. ii. part 1, page 415. They were communicated to him by Mr. Key:—

Case 1.—*Slight Paralysis from Disease of the Cervical Vertebræ.*

A young lady, aged thirteen, had been for about twelve months troubled with pain in the neck, which at first was considered as the effect of a cold. This not going off, was treated by her medical attendant as a glandular affection. This pain continued to increase, until at last she could not rise from the horizontal position without great pain, being also obliged to support her head by placing her hands on each side. When Mr. Key first saw her, she was emaciated, and her countenance betrayed great suffering. On examining her neck there appeared a general fulness, which gave her pain on pressure; she had the power of slightly moving the head backwards and forwards, but the lateral movement was accompanied with so much pain that she could not be prevailed on to attempt it. The case seemed evidently an affection of the two upper cervical vertebræ. After some time a tumour was perceived at the back of the pharynx, which, on puncture, yielded about three ounces of pus, and which Mr. E. concluded had communication with the diseased spine. This gave some relief; but her emaciation and suffering increased. About a fortnight before her death, vomiting came on whenever she took food, which was allayed by a blister applied in the course of the par vagum in the neck; she had convulsive twitchings of the upper extremities, and a slight paralytic affection of one arm. She sunk gradually.

The second case was that of a young man, aged twenty-three years, who seemed to labour under an affection similar to the last, with a strong tendency to phthisis. Connected with the disease there appeared a tumour in the neck on the right side, just behind the angle of the jaw, which projected into the pharynx; on puncturing this, a quantity of pus escaped, which gave great relief to his breathing and to his pain. The tumour formed again in four days after, and burst, and it does not appear that it gathered afterwards; the external tumour disappeared. He complained of some soreness low down in the œsophagus in swallowing; there was a slight lateral protrusion of the second vertebræ.

The third case was that of a young man, eighteen years old, who complained of great stiffness with swelling at the back of the neck, which he had been complaining of for six months, and which was considered rheumatic. He could not rise from the recumbent position, nor move his head, without much pain; he gradually wasted away. He expired suddenly, in the act of being raised from his pillow; probably from the anterior ligament of the processus dentatus at that moment giving way. A slight tendency to paralysis of the upper extremities was observed on the morning of the day he died.—T.

whatever drink she took. On the fourth day, still vomits; hysterical symptoms gone; she entered the hospital in the evening, and on the following morning presented the following state: — fifth day, countenance very much flushed; eyes very bright; neck swollen; head turned back and flexed laterally, could not be inclined forward without causing great pain; constant pain extending along the vertebral column, from the great occipital foramen to the sacrum; the least movement causes the patient to scream from pain; pain not increased by pressure; respiration embarrassed, and panting; pulse frequent: skin hot and dry; tongue natural; had no stool for the last forty hours (fifteen leeches to the anus; purgative enema; mustard pediluvia; demulcent drinks; soothing frictions over the spine). Sixth day, pain less (blister to the nape of the neck; twenty-four leeches behind each ear). Seventh day, sleep disturbed; increased sensibility of the head and back; tetanic rigidity of the back of the neck and trunk; countenance pale and expressive of pain; respiration more painful than before; pulse the same (bleeding from the arm: blisters to the sacrum; sinapisms to the legs; assafœtida enema). Three minutes after the bleeding, the blood was buffed and cupped; at the end of an hour, the patient very much relieved in every respect, and the bleeding was repeated. Some delirium on the eighth day, when she was bled again. On the ninth, the blood drawn exhibited the same inflammatory appearance as that of the two first days; pain of head and back more intense; features sharpened and very much changed; answers to questions slow and painful—(twenty-four leeches along the vertebral column; laxative enema). At four o'clock in the evening, she no longer answers questions; constant moaning; *subsultus tendinum;* pulse small and frequent; respiration short. On the tenth day, cold and clammy sweats over the face; all the other symptoms were aggravated, and she died at noon.

Post-mortem. — The spinal canal was opened through its entire extent, and on cutting into the dura mater we found a layer of whitish, opaque, membranous matter extended over the spine, from the great occipital foramen to the sacrum; on pressing it with the finger, a turbid liquid, mixed with albuminous clots, are made to flow into the cranium; on drawing the scalpel over this membranous layer, the instrument slides on and takes up nothing, which seems to indicate that there is a membrane above this layer; dissection soon proves it. On detaching the arachnoid from the inner surface of the dura mater, we discover that the diaphanous membrane covering the purulent layer, is but a continuation of it; it is evidently the portion of the arachnoid which, under ordinary circumstances, covers the pia mater, and which is here separated from it by a layer of pus. Here then the pus is found exhaled, not into the cavity of the serous membrane, but on the external surface of this membrane, in the cellular tissue uniting it to the pia mater. On the brain, the arachnoid and pia mater are very much injected towards the fissure of Sylvius. On the right side we find an albuminous

concretion, similar to that which fills the vertebral canal; we also find another, still thicker, on the external surface of the right hemisphere, near the great interlobular fissure. Concretions similar to the preceding are found beneath the *tentorium cerebelli*, and a still greater quantity than elsewhere between the lower surface of the cerebellum and the base of the cranium. The lateral and third ventricles were very much distended by a great quantity of milky serum. Thoracic and abdominal viscera sound.

Remarks. — This case presents a combination of the different symptoms which characterise, in the most striking manner, acute inflammation of the membranes of the spine. Yet at first, it did not commence by these symptoms; it might have even been taken for a simple neurosis, and probably it was then nothing more; we think that there are many cases of this kind, and that some inflammations are preceded by mere nervous disturbance, in which the disease then entirely consists; at which moment, narcotics have a marvellous power of dissipating the symptoms, but if it be allowed to proceed, it will soon change its nature; and those functional disturbances, which, a while ago, were the expression of an affection merely of innervation, will afterwards be produced and kept up by an inflammatory process, where narcotics would be mischievous, and other means must be resorted to.

During this first period, which appears altogether nervous, those vomitings also appeared, which are so often connected with cerebral affections, mark their onset, and precede their characteristic symptoms. It is only from the fourth to the fifth day, after the appearance of these different symptoms, that the first phenomena, indicative of the nature and seat of the disease, disclosed themselves. The intellect remained for a long time unaffected; whilst, on the contrary, sensation and motion became seriously altered. In none of the preceding cases have we seen anything similar to the acute pains felt all along the vertebral column, accompanied by some tetanic symptoms. Cerebral meningitis also existed; and it is not improbable that the inflammation ascended from the spinal canal into the cranium only towards the termination of the case. We are disposed to consider that the difficulty of respiration arose from the circumstance of the spinal cord, in which we include the medulla oblongata, being the special seat of the disease. The moral cause which brought on the suppression of the catamenia is an additional reason for our considering that the affection, in the first instance, was merely nervous.

Case 27.—Spontaneous luxation of the first two cervical vertebræ—Hemiplegia.

A man, thirty-five years of age, of a strong constitution, had always enjoyed good health, except that he twice had syphilis, for which he says he was properly treated. After having suffered considerably from pains in different parts of the body, in the left knee, in the region of the kidneys, and the left thigh, he was then attacked with pain in the left side of the head, which soon spread to the

same side of the face; some time after he began to complain of his neck, the motions of which became very much constrained; about a month after this the patient discharged by the mouth a great quantity of pus. The medical man who saw him at this time thought that the purulent discharge came from an abscess which formed between the pharynx and vertebral column, and which opened into the pharynx. However, it ceased at the end of seven days; but from this period the patient's countenance changed rapidly; he wasted away; continued to feel pain in the left side of the neck, his head inclined over the right shoulder, and his face was directed towards the same side. Some weeks after, the fingers of the left hand became the seat of a pricking sensation; the day after they were, as it were, benumbed, and could not be moved without difficulty; the day following, the entire upper extremity of the left side was deprived of motion; next day he felt the lower extremity of the left side a little weaker than the right. He entered the hospital on the 10th of June, and presented the following state: lies on his back, head and face inclined to the right, without any sensible contraction of the sterno-mastoid muscles; lancinating pain throughout the left side of the head; left pupil not so much dilated as the right; conjunctiva of this side considerably injected; left eyelid hangs a little over the eye; vision equal on both sides; intellect sound; total loss of the contractile power of the left arm; its sensibility entire; perceptible diminution in the motions of the left lower extremities; tongue a little red. There was an issue in the nape of the neck, which was still retained. On the day after, the head having been a little deranged from his position during the dressing, and inclined somewhat to the left as also the face, the two extremities of the right side instantly lost the power of moving; they recovered it the moment the head resumed its usual position. On the nights of the three following days, delirium set in, pulse frequent. Sinapisms were ordered. Two days after, at six o'clock in the morning, the patient was in the same state as on the preceding days; he conversed quietly with the other patients who were near him, and there was no sign as yet of his dissolution being at hand. At seven o'clock he suddenly lost the facility of speech; his body was covered with a cold sweat, his respiration became remarkably slow, then stopped altogether, and he died at half-past seven.

Post-mortem.— 25 hours after death. The brain being examined with the greatest care, presented no appreciable lesion in its substance; its ventricles were nearly empty; the external arachnoid was considerably injected. Immediately on separating the *pons Variolii* from the medulla oblongata, we perceived sanious pus of a reddish grey colour flow in great abundance from the great occipital foramen. The transverse ligament of the atlas which separates the spinal cord from the odontoid process, was entirely destroyed, and this process was in immediate contact with the cord, which being pressed by it was transformed on that part into a soft pap.—

The entire process was rough and uneven. The superior articulating cavity of the atlas, on the left side, did not hold by any ligamentous connection or any capsule to the condyle of the occipital bone; both presented a dark rough appearance, and were bathed in an immense quantity of pus. The left portion of the posterior arch of the atlas was also carious. The inferior articulating process of the atlas, and the superior process of the dentata of the right side, were also separated from one another, and their surface were black and rough. Finally, the left portion of the anterior surface of the body of the dentata was equally deprived of periosteum, and presented numerous asperities; it was separated from the pharynx by a purulent collection of a dirty grey colour, which communicated with this passage by a fistulous opening, the orifice of which corresponded to the fourth cervical vertebra.

Remarks. — Let us now endeavour to connect the lesions found after death with the symptoms during life, and let us see how far the one may clearly explain the other. In the first place, it is evident that the purulent discharge which took place by the mouth, about two months before death, had the origin ascribed to it by the medical man who saw him at the time; it is probable that some pus flowed every day through the fistulous opening in the posterior wall of the pharynx; but coming only in small quantities at each time, it passed probably into the stomach. It is again probable that the disease of the first two cervical vertebræ commenced long before it manifested itself by any well-marked symptom; but in proportion at this disease advanced, the different ligaments securing the connexions of the occipital bone and the first two vertebræ, were destroyed, gradually, and at last became totally disorganised. As soon as this destruction was carried to a certain degree, the displacement of the articulating surfaces was the inevitable consequence; thence compression of the cord by the luxated vertebræ. There was a luxation on the right as well as on the left. The inclination of the head and face to the right shows that the displacement took place principally on the left, at the atloido-occipital articulation: the paralysis also existed on this side. One day a momentary paralysis was noticed on the right side, in consequence of a slight change in the position of the head. This circumstance is easily accounted for, by supposing that in this change of position the diseased articulating surfaces of the right side came to ride one over the other. The permanent inclination of the head without contraction of the sterno-mastoid muscles, might have inclined one to suspect luxation of the vertebræ. The manner in which the head inclined over the shoulder, without the neck seeming to participate in this flexion, as happens in the natural movements, indicated that the luxation took place very high up. It must be admitted that at first the odontoid process underwent but very slight displacement.— But a period arrived when, whether after some sudden movement, or in consequence of the destruction of the transverse ligament, the spinal marrow came to be compressed and disorganised by this

process. This phenomenon may be referred to the time when the patient suddenly lost the faculty of speaking, and when his respiration became embarrassed; death supervened as soon as the disorganization of the cord was such as to incapacitate it for the discharge of its functions. Some would connect the caries of the vertebræ in this case with the syphilitic attack under which the patient had previously laboured.

Case 68.*—Phenomena obscure at the commencement of the disease—Constipation—Retention of urine—The fifth day, paralysis affecting the motion of the lower limbs with morbid exaltation of the sensibility—Rigidity of the neck and trunk, accompanied with pains along the spine on raising the patient.—The seventh day, the same phenomena in the upper extremities, but in a less degree—They became a little rigid—Symptoms gradually became more severe—Death at the commencement of the tenth day—Puriform exudation between the arachnoid and pia mater of the cord—Injection of the cerebral vessels—Turbid serum in the ventricles.

A man, twenty-four years of age, of rather a strong constitution, entered the *Hôtel Dieu*, the 19th of October, 1823, stating that he had been ill for the last five or six days. He complained of no particular part as being the seat of acute pain; his illness was general, but slight; still his countenance was expressive of suffering; his answers were slow; lips seemed to tremble as when a person is going to cry; no appreciable symptom of fever; heat of skin natural; no symptoms of gastro-intestinal irritation. He remained for two days without undergoing any change. He arose out of bed and walked through the ward, but not having passed any urine since entering the hospital (three days), the catheter was introduced; bladder very much distended. On the 24th Oct. (fifth day), M. Dance examined the patient more particularly; his countenance still expressive of suffering; seems always as if going to weep; answers slow and vague, when questioned regarding his state, about which he does not furnish any more information; bladder still distended; on raising the lower extremities he screams with pain, particularly on moving the right lower extremity; pinching felt equally in both limbs; sensation also perfect, but he cannot raise them; he cannot even extend them after they have been flexed; they fall back on the bed as inert masses, if left to their own weight; they are deprived of motion but not of sensation. The vertebral region was then examined, which presented nothing unnatural; it was remarked that he could not replace himself on his seat; that he suffered on the least flexion of the spine, and that the neck was slightly retroverted; on attempting to incline it forward, it could be done only to a certain degree, and by causing the patient some pain; he was now very irritable. In the upper extremities motion and sensation underwent no change; pulse has some frequency and a little hardness; skin hot; tongue natural; no stool for the last five days; no rigidity nor convulsions in the lower

* A few cases of Spinal Meningitis are here added from Ollivier's Treatise on Diseases of the Spinal Cord. The numbers annexed to the cases refer to Ollivier's work. — T.

extremities (venesection, enemata). On the 25th, same state; distention of the bladder; pulse frequent; skin hot; limbs painful when moved, particularly that on the right side; same state of countenance and slowness in the association of his ideas; same pain on turning the patient (another bleeding). On the 26th the same appearance; pulse now very small and more frequent; bladder still distended; urine fetid, turbid and reddish, contains a gaseous fluid which is heard escaping by the catheter, which is blackened by remaining even for a short time in the bladder; blood last drawn buffed and cupped. In the evening state worse; pulse nearly extinct and very frequent; still the heart beats with considerable strength; lower extremities sensible, but cannot move, and are very painful when any one attempts to move them. This paralysis and morbid sensibility begin to appear in the upper extremities, which present a slight rigidity; trunk and neck rigid; countenance still expressive of suffering; answers slow but precise; tongue moist; evacuations from the bowels scanty. On the 27th same state; parietes of the bladder have now lost all contractility; upper extremities weaker; one stool (sinapisms to lower extremities). On the 28th, patient now much worse in every respect; the contractile power of the upper extremities weakened; they are half-flexed, and evidently rigid, as are the entire trunk and neck; head somewhat inclined backwards and to the left; right pupil more dilated than the left; respiration slow; motions of ribs incomplete; bladder still distended; escape of fetid gas with the urine through the catheter; no stool. Died on the 29th, the tenth day of the disease.

Post-mortem thirty hours after death.

Cerebro-spinal Cavity.— Marked injection and distention of the spinal vessels; membranes healthy; lateral ventricles very much distended, containing about three-fourths of a glass of serum, somewhat opaque; the other ventricles were also distended. The vertebral canal being opened through all its extent, we observe, external to the dura mater, in the cellular tissue surrounding it, a network of vessels injected with blood. This membrane seemed very much distended and immediately applied to the cord, which already indicated a particular development of the parts contained in it. The dura mater having been cut into through its entire length, the cord appeared covered by a gelatinous layer, slightly yellowish, four or five lines thick, which was applied immediately over the pia mater. This layer was very thick towards the lumbar enlargement of the cord, and there also the yellowish colour was deeper; it gradually diminished in thickness in ascending as far as the third or fourth cervical vertebra, where it ceased altogether; there was no trace of it on the cauda equina; it was less thick and less perceptible on the anterior surface of the cord than on the posterior surface. This gelatinous layer was situated between the pia mater of the cord, and the corresponding arachnoid reflexion; that which lined the dura mater was also covered with a very delicate false membrane

granulated, and of little consistence. This puriform, concrete substance, subjacent to the arachnoid, was not liquid, whether by reason of its tenacity, or because it was contained in the meshes of the sub-arachnoid cellular tissue. The lower part of the spinal canal, beneath the arachnoid, contained four or five spoonfuls of opaque serum.

Thorax. — Lungs adhering at all points of their surface, by organised cellular bands of long standing; the right lung posteriorly, was evidently in the first degree of hepatisation; its tissue friable and gorged with blood; heart natural.

Abdomen. — Mucous membrane of the stomach plaited, grey, slate-coloured, and even somewhat blackish, for a considerable portion of its extent; in some parts it was studded with red dots, as if from ecchymosis; that of the intestines was very much injected, reddish, and the intensity of this colour, which occupied the lower fourth of the intestine, went on increasing as far as the ileo-cæcal valve; the mucous membrane of the bladder was thickened, reddish, slate-coloured, evidently inflamed, and filled with thick, fetid urine.

Remarks.—This case presents, in a manner, the complete history of spinal meningitis, and the symptoms of this inflammation were, as we see, conformable to the lesions found on the dead body; the invasion of the disease was obscure; the patient remained four days in the hospital before we were able to determine what his disease was. The first four days he arose out of bed and walked about the ward; so that it is evident the locomotive powers were not affected till the fifth day; up to that period, paralysis of the bladder and retention of urine were the only symptoms that could create any suspicion of lesion of the spinal cord or its membranes; the functions of the intestines were at the same time destroyed, and constipation existed nearly from the commencement of the disease till death. Paralysis of the motive power of the lower extremities, with morbid exaltation of the sensibility, are the phenomena which then appeared, and to which were joined rigidity of the neck, inflexibility of the trunks, pain in the trunks and limbs on moving these parts. Such was the series of the symptoms which manifested themselves successively in the course of the spinal meningitis. Again, if we consider the peculiar appearance of the countenance, the difficult association of ideas, the slowness of his answers, which were noticed from the commencement, it may probably be supposed that the cerebral lesion preceded that of the membranes of the cord: so in fact it appears to me; but the changes found in the encephalon, and which are also entirely conformable to the state of the cerebral functions during the disease, were not of a nature to have influenced the progress of the spinal meningitis; they probably contributed to throw obscurity over its first progress. What makes it probable that they could not exercise any influence on the progress of the spinal meningitis, is, that the latter manifested itself by symptoms which proved its ascending progression, and its commencement in the lower portion of the cord. It may be remarked, that the neck becoming

rigid, and the upper extremities losing their strength, were subsequent to the paralysis in the motion of the lower extremities. The muscular movements were abolished in the bladder, the intestine, and the lower extremities, whilst the upper extremities had lost but a portion of their motive power; and the pseudo-membranous layer was found, in the dead body, much thicker inferiorly than superiorly, which seemed to indicate that the inflammation had been of longer duration, and of a less recent date in the former region. The pain felt by the patient on moving the limb or trunk, may, perhaps, be explained by the slight dragging, or shaking, which the inflamed membranes of the cord then suffered; the same phenomenon being also observed in pleuritis, where the slightest pressure increases the sufferings of the patient. The involuntary contractions of the vertebral muscles, which rendered the spine like an inflexible stock, seem also the result of those instinctive motions which we so often execute for the purpose of avoiding or preventing pain. The vertebræ, by becoming fixed one upon the other, prevented the spinal membranes from experiencing so much dragging. The morbid exaltation of the sensibility seems to be one of the characters of spinal meningitis.

According to Lallemand, the sensibility is not as often abolished as the power of motion, because the nervous centres are in two very different physiological conditions in the production of motion and of sensation; they are active in the performance of the former, whilst for sensation they are merely passive; they only receive the impression. The rigidity and semi-flexed state of the upper members observed in this case, support M. Lallemand's opinion, who considers convulsion and rigidity of the limbs as a symptom of inflammation of the coverings of the nervous centre. In this case, traces of inflammation were found in the lungs, stomach, and bladder. The state of the lungs may be easily accounted for by the difficulty of the respiration during the last period. The state of the stomach and intestines gave rise to no symptom, except we refer to it the burning heat of skin, and the great thirst. We are inclined to think that those inflammations so often met in these cases are the effect of sympathic reaction, and of the numerous connexions uniting the spinal cord to the respiratory and digestive organs. With respect to the cystitis, it was attributable no doubt to the decomposition of the urine, and to the irritation caused by the sound in the bladder. What was remarkable in this case, is, that the symptoms were continued, those painful tetanic contractions so characteristic in such affections, which come on at irregular periods, and are followed by more or less remission, not having been here at all observed.

CASE 72*.—Permanent tetanic contractions, accompanied with symptoms of cerebral meningitis—Death on the ninth day—Puriform exudation at the base of the left hemisphere, and in the middle of the dorsal region, under the arachnoid—Gelatinous infiltration of the cellular tissue, external to the spinal dura mater.

A male child, between three and four years of age, was brought to the *Hôpital des Enfans-Trouvés.* The first symptoms were very great difficulty of deglutition; remarkable fixedness of the eyes, to which soon joined tetanic symptoms: trismus, opisthotonos.—(Repeated application of blisters behind each ear, sinapisms to the lower extremities, frictions, tepid baths produced no amelioration.) The child was continually comatose. Died on the ninth day.

Post-mortem. — *Cranium.* — Cerebral substance very much injected and firm; the grey substance of a very deep colour; white substance of a pearly aspect, containing some injected vessels, particularly around the ventricles, which contained a considerable quantity of serum. Their lining membrane thickened and injected.—That of the lower part of the left hemisphere was covered by a thin albuminous concretion, and the same membrane presented a very bright red injection on the convexity of the two hemispheres, and in some parts of the cerebellum.

Spine. — In the middle of the dorsal region, there was a reddish infiltration, of considerable consistence, in the cellular tissue between the dura mater and the bony canal of the spine. On making an incision into the membranes, their cavity was found filled with serum; the vessels on the snrface of the pia mater were very much injected, in the middle of the dorsal region only, where the arachnoid covered an albuminous concretion of about four inches in length. The substance of the cord a little more injected than natural.

Thorax. — The pleura pulmonalis of the right side adhered to the pleura costalis and to the diaphragm by a false membrane of some thickness, and not organised.

Abdomen. — The stomach, which was contracted on itself, contained some frothy mucus. The mucous membrane of the small intestines also was covered with a grumous whitish mucus. That of the large intestines was of an intense red colour, through all its extent. The mesenteric ganglia were very large, soft, and white. Liver pale.

Remarks. — The spinal meningitis, though circumscribed, contributed no doubt to cause the tetanic contraction of the trunk in this case; yet we must also take into account that the cerebral meningitis must also have exercised some influence in producing this phenomenon, it alone being in some cases sufficient to produce the retroversion of the neck, It is evident from this case that inflammation of the membranes of the cord may be confined to a portion of their extent more or less circumscribed; we shall presently see another case fully demonstrating this pathological fact. There was also found a gelatinous and reddish infiltration in the cellular tissue,

* Ollivier, vol. ii., p. 585.

external to the dura mater; and I shall here remark, that this change appears to be sometimes the sole product of spinal inflammations. — The existence of thoracic and abdominal inflammation, which is so frequent a coincidence with affections of the spine, is to be set down as a consequence of the physiological and pathological relations connecting this nervous centre with the different apparatuses of organic life.

Case 73.*—Deep-seated pain in the lumbar region, after a violent effort; cerebral symptoms followed by debility, and partial paralysis of the limbs; urine and fæces discharged involuntarily—Death twelve days after the appearance of the latter symptoms—Effusion into the right ventricle; meningitis of the convexity of the left hemisphere; capillary injection, of about an inch in extent, beneath the arachnoid of the meningeal sheath of the cord in the lumbar region.

A man, twenty-eight years of age, entered the hospital *La Charité*, April 4, 1823. He had been treated at the *Saint Louis* for a deep-seated pain which he felt in the lumbar region, after a violent effort to raise a load in September, 1822. A blister was applied over the seat of pain, which was very long in healing. On entering *La Charité*, he complained of general debility; he was very much dejected, and considerably emaciated. On the 7th of the month, he presented the following symptoms: — extreme difficulty in answering questions, inability to articulate certain words; mouth slightly inclined to the right; face a little red; left arm weaker than the right; sensation and motion of the lower extremities natural; urine and fæces passed involuntarily — (arnica, blisters to legs, purgative clyster). On the 8th, several stools, pulse slow; mouth straight, countenance pale; unable to articulate one word; motion of the left arm more difficult than that of the right — (volat. linim. with tinct. cantharid. to be rubbed on the limbs). On the 9th, both arms move equably; loss of consciousness. On the 10th, deglutition impossible; he manifests some pain when his legs are taken hold of to dress the blisters; respiration frequent, not stertorous. Died at ten o'clock in the morning.

Post-mortem (twenty-two hours after death). *External appearance.* — General emaciation: great rigidity of the limbs; chest flattened and narrowed.

Head. — Vessels of the brain gorged with blood, patches of a yellowish grey colour on the surface of the left hemisphere, formed by a concrete substance effused under the arachnoid; considerable serous effusion into the right ventricle.

Spine. — Whitish turbid serum (about an ounce and half) in the lumbar portion. On the right side a sort of ecchymosis, an inch broad, formed by a number of small capillary vessels injected, subjacent to the arachnoid lining the dura mater; the injection deeper in the centre; the arachnoid was neither thicker nor more opaque on this part, which corresponded to about the third vertebra. Its inner

* Ollivier, vol. ii., p. 589.

reflexion was separated from the pia mater of the cord, posteriorly only, by a frothy serum which diminished towards the upper part.

Thorax. — Some adhesions of the left lung to the pleura. Its inferior lobe presenting pneumonia in the third stage; pus escaped from it on making an incision; upper lobe filled with miliary tubercles in different dgrees of softening. It crepitated however. — Entire of the right lung adherent, crepitating, filled with grey granulations.

Abdomen. — Liver occupies the two hypochondria, concealing the stomach; it was gorged with blood, Veins of the stomach dilated. Small intestines presented some partial redness in their interior. — Bladder dilated, urine deep-coloured, fetid, not ammoniacal; its mucous membrane pale.

Remarks. — The continuance of the pain in this case, and the relation existing between its seat and that of this isolated inflammation, incline us to think that the effort made to raise the heavy load had been the cause of it. The patient was in some respect cured of this when he entered the hospital, and died of cerebral meningitis. — The turbid liquid found in the spinal membranes came probably from the cavity of the cranium, being a portion of that which distended the ventricles. The cases now given belong to acute spinal meningitis; and the symptoms, as well as the changes found after death, show what great influence the spinal cord possesses over the organs of nutritive life, in which we very frequently find evident traces of an inflammation which was developed during the course of the spinal affection. But when the meningitis is chronic, its symptoms are less obvious, consisting merely in obscure pains of the back, with a feeling of restraint and fatigue in the limbs, and the attention is in general exclusively directed to the morbid phenomena which arise from the viscera secondarily affected, the true causes of which are too often misunderstood. Colouring more or less deep of the membranes, and a thickening of them, are the ordinary anatomical characters of this chronic inflammation, which also usually leaves after it cellular adhesions between the arachnoid and pia mater, and between the two arachnoid reflexions.

RECAPITULATION.

CHAPTER I.

LESIONS DETECTED IN THE MENINGES BY POST-MORTEM EXAMINATIONS.

ARTICLE I.

Lesions of the Dura Mater.

Lesions in the dura mater are much more rarely met with than in the two other cerebral membranes. In the cases already detailed, there are two which present remarkable instances of tumours developed on the inner surface of the dura mater, one of them being seated in that portion of the dura mater which is in contact with the vault of the cranium, whilst the other was formed on one of the two portions of the tentorium cerebelli. These* tumours had a texture analogous to that of the dura mater itself. One of them was constituted exclusively of fibrous tissue. In the other there was mixed with this fibrous tissue, a certain quantity of ossiform matter. Both these abnormal products bore a strong resemblance to the fibrous bodies of the uterus. In the two cases, the nervous substance was rather wasted than compressed, where it was in contact with the tumours. In one of these cases we could not refer the disease of the dura mater to any appreciable cause. In the other case, it was after external violence inflicted on the occipital region, that the tentorium cerebelli became the seat of the osteo-fibrous vegetation already described. Here then is one of those cases wherein we must have recourse to the existence of a disposition altogether peculiar, in order to explain those infinitely varied lesions which one and the same cause is capable of producing.

One of our cases presented us with a considerable ossification of the great fold of the dura mater, known by the name of the falx cerebri; this is the part of the dura mater most frequently incrusted with calcareous phosphate. In two cases, where it presented no trace of ossiform substance, this falx was transformed, for almost its entire extent, into a large plate of cartilaginous texture.

The very fine cellular tissue interposed between the proper tissue of the dura mater, and that of the arachnoid lining its inner surface, has presented to us some lesions worthy of remark. First, we have

* These tumours are different from the fungoid tumours which appear to be connected with the arachnoid of the dura mater; they arise from the structure of the dura mater itself, with which they are intimately joined, and from which they are inseparable without tearing that membrane. — Bright, vol. ii. 663.

For a highly interesting case of tetano-epileptic convulsions, where a bony deposition was found in the falx, as reported by Dr. James Johnson, see Medico-Chirurg. Review, April, 1835. — T.

found in it those cartilaginous or bony plates mentioned above, and we have elsewhere* shown that the ossifications of fibrous membranes are much more frequently seated in the cellular tissue, immediately touching these membranes, than in their own proper tissue.

On one occasion we found the arachnoid separated from the portion of dura mater corresponding to the arch of the cranium, by small depositions of pus, between which the membranes appeared quite sound. These depositions were five in number, and existed only on the left side: each of them appeared as a white layer, from three to four lines thick, interposed between the arachnoid and dura mater. There was at the same time sero-purulent infiltration in the subarachnoid cellular tissue of the convexity of the hemispheres. We have never met a case of serum being effused between the arachnoid and dura mater.

ARTICLE II.

Lesions of the Arachnoid.†

The lesions of the arachnoid, as those of other serous membranes, are principally referrible to its products of secretion. This may be modified in different ways, though at the same time the arachnoid does not receive more blood than usual, and may not have undergone in its nutrition any appreciable modification.

It should not be admitted that the arachnoid has been the seat of a morbid secretion, except when the product of this secretion is found in its cavity. Now this case is itself much more rare than that in which the morbid product is found outside the arachnoid, in the cellulo-vascular tissue constituting the pia mater.

The morbid products found in the cavity of the arachnoid are the following:—

1. An effusion of clear, transparent serum. Such an effusion is very rare on the upper surface of the brain; it is more common at the base, towards the occipital fossæ. 2. An effusion of turbid, milky serum, with purulent flocculi. We have seen but one instance of this sort in the great cavity of the arachnoid. 3. False membranes not yet organised, lining one or other of the free surfaces of the arachnoid. 4. False membranes of longer standing than the preceding, of serous organisation, extended over one or other free

* Pathological Anatomy.

† The arachnoid and pia mater are so intimately connected as to be scarcely separable from each other, except at the base of the brain. . . . . The arachnoid of the adult in its healthy state is supposed to possess very little vascularity; but its substance is so delicate, that the vessels of the pia mater are distinctly seen through it; and when fluid is effused into the cellular membrane of the pia mater, some of the vessels appear evidently to lie on the surface of the fluid, as if they belonged to the arachnoid, and do not dip down between the convolutions. — Dr. Bright, M. R., vol. ii., p. 669. — T.

surface of the arachnoid. 5. Adhesions of a cellular appearance, similar to the bands of the pleuræ, and extending from one of the free surfaces of the serous membrane to the other. There are some cases in which, instead of any of these anormal products, we have found nothing but remarkable dryness of the arachnoid on the surface not adhering. It would appear that in such a case there had been during the last period of life, a suspension of the exhalation of the fluid, which ordinarily gives to this membrane a certain degree of polish and moisture.

With or without these latter degrees of alterations of secretion, we have never observed in the arachnoid the least vascular injection; neither have we ever seen in it either change of colour or thickening. It appeared to us that the cases wherein the arachnoid appeared at first view either coloured or thickened, were cases where there were lesion of the subjacent cellular tissue.

Whatever be the nature of the delicate membrane lining the inner surface of the ventricles, this membrane presents, in the pathological state, nearly the same lesions as the arachnoid developed around the brain, but the former are more frequently met with.

It is much more common, for instance, to find serum effused in considerable quantity into the ventricles than into the great cavity of the arachnoid covering the convexity of the hemispheres. The presence of this serum in the ventricles should be considered as the result of a morbid process only when its quantity exceeds an ounce in each lateral ventricle. When it is very abundant, it raises the upper wall of the ventricle, and, on pressing gently with the finger, this wall presents a manifest fluctuation. In such case there can be no doubt but that the accumulation of serum in the cerebral cavities is a morbid phenomenon. We seldom find any perceptible difference in the quantity of fluid contained in each ventricle. Whenever this quantity was very considerable, we have found the *septum lucidum* and the *fornix* very much softened. In some cases we have seen the two laminæ of the *septum lucidum* separated by serum, and the cavity of the fifth ventricle thus become accidentally quite manifest.

Instead of limpid serum we occasionally meet in the ventricles a turbid liquid, in which are observed those floeculi, called albuminous, which constitute so frequent an anatomical character of *pleuritis* or *peritonitis*.

In some of the cases which came before us, we have seen the ventricles filled with a collection of real pus, which, by reason no doubt of its greater weight, was found accumulated in great quantity, principally at the lower part of each lateral ventricle, or in the ancyroid cavity.

In most of the cases where pus was found within the lateral ventricles, some was also observed at the same time in some points of the sub-arachnoid cellular tissue surrounding the nervous centres.

The membrane yielding these varied products, once presented to our view some finely injected vessels, which lined as a network the

inner surface of the parietes of the ventricles. In all the other cases, in those even where pus filled the ventricular cavities, no appreciable lesion appeared in the membranes lining their parietes.

We do not, in fact, consider as an alteration of nutrition in this membrane, but as a product of morbid secretion, small granulations,* which are sometimes seen scattered on the inner surface of the ventricular parietes, a remarkable specimen of which we observed in one of our cases.

ARTICLE III.

Lesions of the Pia Mater.

These have been much more frequently observed than lesion of the two other membranes. The lesions which this membrane has presented are the following:

1. Infiltration of its tissue by a clear, colourless, transparent serum. Sometimes this serum forms but a thin layer interposed between the arachnoid and the cerebral substance; sometimes accumulated in more considerable quantity beneath the arachnoid, it raises this membrane, and distends the cerebral anfractuosities.

2. Infiltration of the tissue of the pia mater by a turbid, milky liquid, and sometimes by real pus.† The latter has sometimes a remarkable consistence; it is as it were intimately combined with the cellulo-vascular tissue within which it is formed; it is concrete like certain pseudo-membranes of the pleura or peritoneum.

3. A real state of scirrhous induration of the tissue of the pia mater. We once saw such a state; between the arachnoid and the circumvolutions of the cerebral hemispheres there was a layer of solid matter, of a bluish grey, from five to six lines thick. This layer existed over nearly the entire extent of the convexity of the two hemispheres.

4. Serous cysts‡ variable in size and number. These may, in proportion as they become developed, compress the cerebral sub-

* This is a result of inflammation of the surface of certain parts becoming scabrous, as if covered with fine sand; this appearance takes place in different parts, and is frequently very manifest about the foramen of Munro, or the peduncles of the pineal gland. — Bright, vol. ii., 692. — T.

† This is an undoubted result of inflammatory action, filling the meshes of the pia mater with a semifluid substance of a colour much resembling pus; it is not effused upon the surface of the arachnoid, nor does it remain upon the surface of the brain; but when the membranes are drawn off, it separates with them, leaving the convolutions quite exposed, and when an incision is made into the membranes, none of the yellow deposit escapes. — Bright, vol. ii., 674. — T.

‡ These serous cysts appear to be placed between layers of serous membrane, or to be contained in adventitious membranes; they vary from the size of a pea to that of an orange; they are of a most chronic character, often give no symptoms by which their existence is even suspected, and are probably coeval with life, not only the brain, but the bony parietes being often moulded to their form. — Bright, vol. ii., 675. — T.

stance more and more, and thus become, in a way altogether mechanical, the cause of different phenomena.

5. Cartilaginous, or osseous plates, which we have seen in one case cover, like a second arch, the anterior fourth of the convexity of one of the cerebral hemispheres.

6. Tubercles, sometimes few in number and scattered over a broad surface, sometimes numerous and collected together, and forming, by their union, homogeneous whitish, masses, which, on the one hand, compressed the arachnoid, through which they were seen, and which, on the other hand, sunk deep into the circumvolutions, the tissue of which they compressed. In one case, where these tubercles were thus collected, the pia mater had, at the same time, contracted such intimate adhesions with the cerebral substance, that the latter was detached in large portions along with the pia mater.

It often happens that tuberculous matter is deposited between two circumvolutions, the interval between which it perfectly fills up. It then happens that the two portions of pia mater, covering each circumvolution, come to form strong adhesions to each other, and in such case, a cursory examination might incline us to think that it was in the parenchyma of the brain that the tubercular matter was deposited.

7. Adhesions. — These are formed between the portions of pia mater leaving the arachnoid in order to line the interior of an anfractuosity. Then this anfractuosity completely disappears, and several circumvolutions are observed as it were soldered together; they are so firmly united that they cannot be separated unless by tearing them.

In concluding this enumeration, let it be observed, that most of the lesions of which medical writers place the seat in the arachnoid, and which they consider as the anatomical characters of arachnitis, reside most frequently in the pia mater. In almost all the cases, for instance, where the convexity of the cerebral hemispheres was covered with a layer of serum or pus, this layer had its seat beneath the arachnoid; on passing the back of the scalpel over the latter membrane, the morbid product is displaced, but not removed.

Sometimes this product is so extensively connected with the cellulo-vascular tissue, interposed between the arachnoid and brain, that it cannot be displaced even by the process just now mentioned.

Every time we found tuberculous matter deposited around the nervous centres, in their enveloping membranes, it was not the arachnoid that appeared to contain this product of morbid secretion; it filled the meshes of the pia mater. We might say as much of the cartilaginous or bony concretions occasionally found in the form of grains, or plates, more or less extensive, around the substance of the brain or spinal marrow; here too it was the pia mater which appeared exclusively to be the seat of them, except in the case above noted, where these concretions were developed between the arachnoid and dura mater.

In fine, it is in the pia mater also that we find those small bodies,

commonly known under the name of *Glandulæ Pacchioni*, which, in some subjects, are found in great numbers towards the edge, which separates the upper part of the internal surface of each cerebral hemisphere, but the existence of which is far from being constant. We think, with several other persons, that these bodies, so improperly called glands, are a morbid product formed in the pia mater, and that they should no more be considered as a condition of the normal state, than should those cellular bands in the pleura, which, in consequence of their great frequency, some ancient authors have considered to be a physiological product. In fact, these bands have been designated, in old anatomical writings, by the name of ligaments of the pleura.

If we now come to consider simple redness, and the different degrees of injection which the membranes may present, we might still further confirm by our own observation what has been said by Chaussier and others; we should find that this redness, more or less bright, more or less extensive, has, ninety-nine times in a hundred, its exclusive seat in the pia mater, and that above the latter the arachnoid remains transparent and colourless.

However, whilst we admit that in the diseases designated by the name of arachnitis, or more properly meningitis, anatomy discovers lesions in the pia mater much more frequently than in the arachnoid; still, we should not assert, as some writers would do, that the arachnoid always remains unaffected. If it is not yet clearly proved that it has been sometimes found either injected or thickened, at least it is certain that morbid products have been found in its cavity. We have adduced cases where there were effusions in the cavity of the arachnoid either of serum or of pus; we have cited others in which cellular adhesions, similar to those of the pleura, united the two reflections of the arachnoid to each other.

The lesions which may exist in the pia mater, may occupy different parts of this membrane. They are found more frequently in the convexity of the cerebral hemispheres than in any other part. When traced over this convexity, we sometimes find them extended to the two hemispheres, sometimes they are confined to one. Thus, in several of our cases, we have seen the upper surface of only one hemisphere, of a more or less bright red colour, or covered with pus, while the other was pale and free from any trace of purulent infiltration, or any other lesion. Frequently too, it is not the entire of the upper surface of one of the hemispheres that is the seat of this lesion (whether injections or any other). It may occupy but a more or less circumscribed portion of this surface; and with respect to the different symptoms which may result, it is well to remark, that there are some cases, where there is found either simple redness, or purulent infiltration, precisely limited:—1st, To the anterior extremity of one or other hemisphere. 2d, To its middle portion. 3d, To its posterior portion. 4th, To its lateral parts. The anterior part of the hemispheres has appeared to be the most frequent seat of the partial meningitis.

We remember to have seen some cases wherein a bright redness existed simultaneously over the entire anterior extremity of each hemisphere; everywhere else the pia mater remained pale.

On the lower surface of the brain the same lesions presented themselves, but with more frequency, at least if we are to rely on what we have seen ourselves. There also the pia mater is seen diseased over a great extent of surface; sometimes, as in the convexity of the brain, some points only are found affected. In the latter case, the part where we have most frequently found purulent infiltration, is that which is around and posterior to the commissure of the optic nerves. Some pus is also observed occasionally within the fissure of Sylvius. One of our cases presented to us the rather remarkable phenomenon of purulent infiltration, which existed only on one of the halves of the pons Varolii and medulla oblongata.

The pia mater covering the cerebellum, appeared to us much more rarely affected than the pia mater of the brain.

The pia mater of the spinal cord presents all the changes to be found in that of the encephalon; but from our own experience, as well as that of others, we find that the pia mater enveloping the spinal cord is much less frequently diseased, than the pia mater enveloping the brain. According to our experience also in most of the cases wherein the pia mater surrounding the spinal cord has become the seat of purulent infiltration, this same infiltration is also found in the encephalic pia mater. On the contrary, nothing is more common than to find the latter considerably altered, whilst the other is perfectly sound.

With respect to the relative frequency of the lesions of the different parts of the encephalic pia mater itself, we find that the lesions of the pia mater of the convexity of the hemispheres, exist more frequently alone than in the lesions of the pia mater of the base. In most of the cases where we ascertained an alteration in the latter, we found it either in the ventricles, or on the convexity of the hemispheres.

Diseases of the membrane lining the inner surface of the ventricles, have not appeared to us necessarily connected with diseases of the pia mater surrounding the brain, either at its base or convexity. We have accordingly adduced some cases in which the ventricles were filled with pus, or considerably distended by serum, without any appreciable lesion existing in the external pia mater, nor in the other parts of the arachnoid.

All possible varieties of alteration of the membranes may exist without the cerebral substance itself participating in any way with these alterations. In most of the cases reported this substance was perfectly untouched. But at other times we found it changed together with the meninges. Thus, in some cases where the inflammation was principally seated in the part of the meninges covering the convexity of the hemispheres, we, not rarely, find the grey substance of the circumvolutions injected and softened; this substance is then raised like a pulp, when we try to separate the pia mater

from it. Sometimes we find no morbid alteration at a greater distance down, and sometimes the entire medullary substance of the hemispheres presents on each slice a great number of red points, which are the divided orifices of so many vessels gorged with blood.

In some cases, where the sub-arachnoid cellular tissue contained a great quantity of serum, we were struck with the species of œdema, of which the cerebral substance was itself the seat. On slicing this substance, and pressing it between the fingers, a serous liquid was expressed from it similar to that infiltrating the pia mater.*

Every time we found in the ventricles serum sufficient to distend them perceptibly, so that their upper wall presented an evident fluctuation, we were struck with the great softening of the central white parts of the brain — namely, the *septum lucidum* and *fornix*.

In one case which we have reported, and where the ventricles contained pus, another species of softening existed; it was seated in the most superficial part of the cerebral substance which forms on the outside of the wall of the lateral ventricles.

In these different cases, the alteration of the nervous substance seems to be a simple complication of the lesion of the membranes. There are other cases, on the contrary, where it is the meningitis that complicates the affection of the parenchymatous substance. Thus, for instance, in certain cases of exclusive softening, which commence quite near the periphery of the brain, we find a partial meningitis, whose limits are marked by the limits of the cerebral softening.

CHAPTER II.

DISTURBANCES OF FUNCTION.

These disturbances are of two kinds; some are referrible especially to the functions of relation or animal life, and serve in a particular manner to characterise the disease; others relate to the organs of nutritive life, and though they may be less characteristic than the former, they are not however void of importance in establishing the diagnosis. We shall now pass them both in review.

* This cerebral œdema is the only alteration we met in an individual, whose body we lately examined, and who, about fifty hours before death, had fallen suddenly, deprived of consciousness and motion. He died with all the symptoms characterising a violent attack of apoplexy. This was serous apoplexy.

FIRST ARTICLE.

DISTURBANCES IN THE FUNCTIONS OF RELATION.

SECTION I.

Lesions of Sensibility.

These lesions have, as their seat, either the membranes themselves, or the different parts which receive nerves from the cerebro-spinal axis.

Similar in this respect to the different fibro-serous membranes, the meninges make known most of their alterations by a greater or less exaltation of their sensibility, whence arises pain of head, which becomes one of the most important symptoms to be considered in the history of meningitis. We shall first set about determining what is the degree of frequency of this symptom, in diseases of the meninges.

Out of twenty-eight cases of affections of the cerebral meninges which we have reported, we find sixteen in which the headache existed, and twelve in which this symptom was not observed; but in these twelve, there was one (case 5) in which the patient was not minutely watched, and another (case 11) in which the delirium having existed from the commencement, the pain of head could not be complained of by the patient.

In the sixteenth case, in which the pain did exist, the alterations discovered in the *post-mortem* were as follow: —

In two of these cases (cases 1, 2) the patients presented after death tumours developed primarily in the dura mater, which had compressed the nervous substance in contact with them.

In two other cases (cases 3, 4) an effusion of blood existed in the great cavity of the arachnoid.

In two subjects (cases 18, 21) no other alteration was observed but considerable effusion of limpid serum in the cerebral ventricles.

Three other subjects (cases 6, 7, 9) presented nothing but redness of the meninges.

Another (case 8) presented pseudo-membranous concretions deposited within the great arachnoid cavity.

In five *post-mortem* examinations (cases 10, 15, 22, 24, 26) we found the pia mater, whether of the convexity, or of the base, infiltrated with pus. On one of these five (case 24) there were also found cellular adhesions intimately connecting together the two reflections of the arachnoid covering the convexity of the brain. — This individual had been all his life tormented with headache.

In only one case (case 16) we found the ventricles filled with purulent fluid.

From these facts we are warranted in concluding that the pain accompanying diseases of the meninges, may exist with diseases of

these membranes widely differing from each other both in their nature and their seat.

Let us now inquire what lesions were found in the membranes in the twelve patients who complained not of headache. In two of them (cases 10 and 16), the pia mater was infiltrated with pus, either the portion of it extended over the convexity of the cerebral hemispheres (case 10), or that covering the base of the brain (case 16). A sero-purulent liquid filled the ventricles in the subject of case 19.

From these facts it follows, that the diseases of the membranes, during which no headache was observed, differed neither in their nature nor in their seat from those in which pain of head was one of the symptoms.

The following table will show the greater or less frequency of the headache in these different cases: —

Nature of the Changes.	Headache.	None.
Accidental productions developed in the dura mater	2	0
Effusion of blood into the great cavity of the arachnoid	2	0
Redness of the membranes	3	0
False membranes in the cavity of the arachnoid	4	0
Purulent infiltration of the pia mater	5	2
Pus effused into the lateral ventricles	1	1
Serous effusion into the pia mater externally, and into the ventricles	2	6
Chronic thickening of the meninges	0	1

Out of sixty-two cases of acute inflammation of the meninges, free from any complication, described in the work of MM. Parent du Chatelet and Martinet on Arachnitis, there were fifty in which pain of head is mentioned as a predominant symptom. Of these fifty, some were cases of meningitis of the convexity, and the others meningitis of the base or ventricles. Of fourteen cases of acute meningitis free from complication, published by Dance, there were twelve in whom this symptom was observed. In the numerous cases published by Dr. Charpentier, of Valenciennes, in his work on Hydrocephalus Acutus, pain of head was noted as a more or less predominant phenomenon of the disease. From this summary of the facts it follows that, in the great majority of cases, pain of head is a symptom of acute and chronic diseases of the meninges, and that it may accompany the most varied lesions of these membranes, either injection of their tissue, or the formation of membranous concretions on the free surface of the arachnoid, or purulent infiltration of the pia mater, or an effusion of pus into the ventricles, or a considerable accumulation of serum within these same ventricles.

Can this headache serve to distinguish an inflammation of the meninges, and is it not also found in other diseases, which, though existing without the brain, may still give rise to several of the symptoms which characterise acute meningitis? To the latter, acute inflammations of the digestive tube, in particular, may be referred. Out of forty-five individuals affected with inflammation of the digestive tube, whether follicular or simply erythematous, whose autopsy is detailed in another part of this work, twenty-one complained of

greater or less pain of head; in the remaining twenty-four this symptom was not noted; but among the latter there were seven, the precise history of whose state could not be satisfactorily ascertained. Out of thirty-one cases, whose history is described in the work of MM. Petit and Serres on Entero-mesenteric Fever, twenty-one complained of pain of head. Among thirty-six patients mentioned in Professor Bouillaud's work on fevers, headache was observed in twenty-eight. Among fifty cases reported by M. Louis, in his work on *Typhoid Fever*, forty-four were affected with headache. From these cases, and several others published by M. Trousseau and M. Dance (in all of which the only lesion found was in the digestive tube), it clearly follows that pain of head is a symptom observed in other instances than those wherein the nervous centres are primarily and idiopathically affected; consequently it cannot be given as a proof of the existence of a meningeal affection. Presenting itself at the outset of several febrile affections, it indicates no doubt a disturbance of the innervation; but it no more established the proof of a real meningitis, than those pains of the limbs do, which are so common in such cases. Is it not again to these pains, which are altogether nervous, and which are not connected with an inflammatory state of the organs in whose vicinity they are felt, that we should attribute several of the epigastralgia so frequent at the commencement of febrile diseases, and which we think are too often and too lightly attributed to a gastritis? Still, pain of head, though joined to a crowd of different affections, may present in cases of meningitis, certain distinctive characters, indicating its connexion with an inflammation of the membranes of the brain. To this matter we shall now direct our attention, considering this pain of head with respect to its seat, its nature, its intensity, and duration, the time of its appearance, and its connexions with the other symptoms.

We have already seen that the headache is observed with equal frequency, whatever be the seat of the meningitis. We shall now inquire whether the seat of this pain of head varies with that of the affection, and whether it is possible to determine exactly the point where the meninges are affected, from the part where the pain of head is felt. On reviewing our sixteen cases where there was headache, we find that in five of them the seat of the pain of head was not pointed out, or that it was stated as affecting the entire head. In the eleven other cases, it was limited to a part of the cranium, and was often circumscribed very exactly to that part. Of these eleven cases of headache thus circumscribed, there are six in which the seat of the lesion of the meninges is very precisely indicated by the seat of the pain. In the five other cases, where, as in those already considered, the pain of head was circumscribed, we find no connexion between the seat of the pain and that of the lesion. With respect to the five cases in which we no longer find the pain of head circumscribed, there is but one of them in which the lesion of the membranes was circumscribed to one point. In the four other cases, the affection of the membranes was much more general; it existed over the entire convexity of the hemispheres in

cases 3 and 11; the serous membrane of the ventricles was specially affected in case 20; and, in fine, the entire of the membrane was affected in case 24.

From these facts we may conclude, that though in some cases the seat of the lesion of the membranes may be indicated by that of the pain of head, it is not always so. We have seen, in fact, some cases in which the meningitis is either much more extensive or much more limited than the seat of the headache seemed to announce. Oftentimes also the pain manifests itself at a distance from the place where the membranes are affected. Thus we have seen a simple frontal pain of head coincide sometimes with meningitis of the base, sometimes with meningitis of the ventricles. This assertion of ours is corroborated by very many cases contained in the work of MM. Parent and Martinet, as also in that of M. Dance on the acute hydrocephalus of adults, in which there is by no means a constant connexion between the seat of the pain and that of the lesion.

If we now seek what is the seat of the headache in severe fevers, we shall find that, in the great majority of cases, the pain is frontal or sub-orbital; that in some it is more particularly felt either at the temples, the sinciput or the occiput; and that in some cases the patients cannot point out the precise seat. There are then some traits of resemblance, with respect to seat, between the headache which is the symptom of a meningitis, and that which exists in continued fever. However, we do not see in the latter case, as in the former, the headache confined to certain points of the head. The intensity of the headache appears to merit considerable attention, when it may be an object to convert this symptom into a sign. The pain of head which accompanies severe fevers is most frequently not known by the physician, unless when he questions the patient on the subject, the latter giving but a mere secondary attention to it. In very many cases of meningitis, on the contrary, it is the patient who first mentions the pain of head; and until he has become either delirious or comatose, this pain is to him one of the predominant phenomena of his disorder; it sometimes forces him even to scream aloud. It has not been found that the different degrees of the intensity of the headache depended either on the nature of the lesions of the membranes, or on their seat. We have found it as acute in cases where there was but simple injection of the pia mater, as in those where the pia mater was infiltrated with pus, or where a false membrane covered the arachnoid. With respect to the seat of the lesions, we find that, in cases where the headache was most intense, some related to meningitis of the convexity of the hemispheres, others to meningitis of the base of those hemispheres, others to inflammation of the entire membranes surrounding the nervous centres, others, again, to effusions of pus or serum into the ventricles. Between these cases, and those where the pain of head was either much weaker, or none at all, we do not find any difference with respect to the lesions; and in order to explain so many varieties, we are always obliged to admit individual disposi-

tions which, with lesions apparently identical, produce, according to the subjects affected, phenomena of the most different kind.

The nature, also, of the pain felt by patients attacked with meningitis is not the same in all. Some think that there is an enormous weight on their skull; some complain of violent lancinating pain, either continued, or returning at intervals; several fancy that a tight band compresses their forehead; some say that their head is squeezed, as it were, in a vice. All motion applied to the head, or even to the other parts of the body, is oftentimes intolerable. We have seen some patients whose headache was increased by slight pressure made on the integuments of the cranium. We never saw, on the contrary, this pressure diminish the headache, as so often happens in the cases of headache called nervous. Most frequently, however, it shows itself, from the commencement, sometimes dull at first, and gradually becoming intense; sometimes, on the contrary, attaining at once its maximum of severity. In several cases of our own, in very many published by MM. Parent and Martinet, and in nearly all those of M. Dance, the pain of head showed itself from the very commencement. The cases in which headache marks the commencement of the disease seem divisible into two series, according as the headache develops itself singly, without any other morbid phenomena accompanying it, or according as its appearance coincides with that of other symptoms. The first series includes the most numerous cases. The time during which the headache continues, the only appreciable morbid phenomenon, may vary from some hours to several days. When this headache thus precedes the other symptoms, there are some cases in which it seems to have nothing serious in it. It sometimes resembles mere rheumatic pain; sometimes it might be taken for neuralgia. There are some individuals who, for some time, seemed to have merely a megrim more or less violent; the mistake was easily fallen into in those cases where, a little after the appearance of the headache, vomiting supervened. The second series includes those in which the headache, still presenting itself at the commencement, is accompanied, from the moment of its appearance, by other symptoms, whether of mere febrile commotion, or of different disturbances of innervation. There are some rare cases in which the pain of head continues with great intensity during the entire disease; but most frequently there are developed on the part of the nervous systems more severe symptoms, which soon prevent it from being perceived or complained of by the patient. It may then be laid down that the pain of head generally exists only during the first period of meningitis. It is very uncommon to see it come on after this period. Headache is almost the only modification of sensibility observed in the ordinary cases of meningitis. In some few of the cases reported by us the cutaneous sensibility was rendered rather obtuse; but it may be remarked, that in one of them the brain itself was the seat of considerable pressure made by a tumour developed in the dura mater. There was one case, also, where the sensibility was very much exalted. From several cases published

by MM. Parent and Martinet, and also by M. Dance, we feel warranted in laying it down, that in the meningitis of adults, modifications observed in the cutaneous sensibility may be considered as mere exceptions; when they do exist, they are to be referred to a peculiar disposition in the subject, and not to any specific lesion.

It is but rarely that pains of any importance are observed in other parts of the body besides the cranium. If we compare, with respect to their nature and their frequency, the lesions of general sensibility observed in cases of acute meningitis, with those seen in cases of typhoid fever, we shall find that in both these lesions scarcely differ either as to their nature or their frequency; so that their existence cannot serve to establish the diagnosis between the acute meningitis and severe cases of fever. We shall now terminate this consideration of the modifications of sensibility in meningitis, by inquiring in what manner the organs of the senses are disturbed in this disease, particularly those of sight and hearing. The modifications in the organ of sight were, for a long time, noted by pathologists as capable of serving to characterise certain acute or chronic affections of the brain. These modifications may be classed under the three following heads:— 1st. Modifications of the motions of the globe of the eye: 2d. Modifications in the state of the pupil: 3d. Modifications of vision itself. The motions of the eye may be altered in several ways: sometimes they are irregular, and, as it were, convulsive; sometimes the globe is immoveable; sometimes there is strabismus of either one side or both. These different alterations in the movements of the eye cannot be referred to any specific lesion. They have been observed in adynamic and ataxic fevers without any appreciable lesion of the nervous centres. Strabismus, however, when permanent, may be considered to possess more value as a sign of meningitis than the irregular movements of the globe of the eye, or its immobility. The state of the pupil is far from being always the same in the different cases of meningitis. Several physicians consider that this opening, contracted and immoveable in the first stage of the disease, becomes dilated and immoveable, as soon as serous or purulent effusion has taken place, either around the brain or into the ventricles. This rule I do not conceive to be always exact; for with lesions precisely identical the pupils may present the most different appearance; and what is more, with lesions altogether dissimilar, these openings may present precisely the same appearance. This was also long since remarked by MM. Parent and Martinet. We find, in their work, cases of dilatation of the two pupils: first, with effusion into the two lateral ventricles; secondly, with effusion into only one ventricle; thirdly, with mere serous or purulent infiltration around the brain (at the convexity or base); fourthly, without any of these lesions. In four cases where dilatation affected only one pupil, the effusion existed in the two ventricles. In another case, where there was also but one pupil dilated, the effusion took place in only one ventricle, that of the side opposite to the dilated pupil. With respect to contraction of the

pupils, MM. Parent and Martinet cite cases where this contraction coincided with an effusion into the ventricles, and other cases in which no effusion existed. M. Guersent, the writer of the article *Meningitis* in the Dictionnaire de Medecin (21 vol. edit.), admits dilatation as an habitual phenomenon only in the last stage of the disease; before that period, he says that the pupils are sometimes dilated, and sometimes contracted.

The result of my own observation, as also of an attentive consideration of the cases published by others, is, that it would be vain to attempt to connect such or such a state of the pupil with any specific morbid alteration of the membranes.

Abstracting from the nature and seat of the lesion affecting the membranes, the pupils in those different affections may present the different states which follow: —

1. The pupils may preserve their natural appearance.
2. Dilatation of the pupils....
   - Equal dilatation.
   - Unequal dilatation.
   - Dilatation of only one.
   - Dilatation of one, and contraction of the other.
3. Contraction of the pupils
   - Equal.
   - Unequal.
   - Of both.
   - Of only one.
4. Alterations of contraction and dilatation of the pupils.

But these different modifications of the pupils are also met in a number of cases, where neither the meninges nor the brain present any appreciable lesion after death. We have observed them with all their shades in individuals labouring under fever. Every one knows also how, even in a state of health, the condition of the pupil varies. And if the iris is thus subject in its movements to a thousand different influences — if it be under the dominion of many other modifications of the nervous centres, besides those which pathological anatomy shall ever be able to reveal to us, why place any great confidence in the signs to be deduced from the different states of the pupil in order to diagnose a meningitis?

Vision itself is, as we have said, frequently disturbed in cases of meningeal affections. In some patients it is entirely lost; in others it is perverted: thus diplopia has been observed in some cases; hallucinations have been also noted; some persons cannot bear the rays of light on the retina. None of these alterations, however, can be said to belong peculiarly to meningitis. Very few cases have been recorded by medical men, in which the faculty of hearing was affected in meningitis. Our second case affords an example of deafness, in which, however, the entire lesion discovered after death was seated on the upper surface of one of the lobes of the cerebellum, and, consequently, at a considerable distance from the origin of the auditory nerves. There was then lesion of function, without any appreciable lesion of the organ destined to perform it. Here, however, some portion of the encephalic mass was found

morbidly changed; whilst, in cases of typhoid fever, deafness has been observed, where the examination after death shows this mass and its envelopes to be in the healthiest state possible, at least to all appearance.

The more we study the different alterations of sensibility presented by individuals attacked by meningitis, the more satisfied we are that none of these alterations are constant, none of them necessarily connected with such or such a form of meningitis, and that disturbance of function is much less dependent on the membrane so affected, than on the brain itself. It is this organ that produces these disturbances, and consequently they must vary in the individual cases, according as the brain participates in, and sympathises with, the irritation of its membranes. In this way also, may be explained the infinite variability of the symptoms of pericarditis; for here too, the determining cause of the symptoms is not in the pericardium, but in the heart itself. What you see on the dead body cannot always inform you what took place during life, and pathological anatomy does not certainly tell us all that is to be known with respect either to the nature, seat, or treatment of disease.*

Lesions of motion. — Lesions of motion are more frequent in meningeal affections than those of sensation, but they are not more constant than the latter, and they are entirely wanting in cases where after death the same anatomical changes are found, as in the cases where these lesions have existed. Lesions of motion observed in affections of the meninges, may be divided into two great classes; in the one, the motions continue, but they are performed in a disorderly way; in the other, the motions no longer exist. The first class comprises the different spasms, which are sometimes clonic, sometimes tonic.

To clonic spasms we shall refer the disturbances of motion, which have been all noted in the different cases published on diseases of the meninges. Some persons present merely a state of general agitation; they are constantly in motion, and rest seems to them insupportable; they are incessantly anxious to change their position. In others, this agitation is confined to some particular part of the body; some patients are constantly moving their arms or legs; in some the trunk is alternately raised and depressed; some constantly

* When either the arachnoid or pia mater, which closely invest the brain, are extensively inflamed, the function of this organ becomes inevitably disturbed by sympathetic irritation, without its parenchyma necessarily partaking of the inflammation, or if the inflammation extend to the parenchyma, it is mostly confined to the superficial layer of the cortical substances. This is exactly the manner in which the functions of the lungs and intestines are disturbed in pleurisy, or peritonitis. Hence, in arachnitis or meningitis, besides headache and intense fever, we have an increase of the general sensibility, preternatural acuteness of the external senses, violent delirium and convulsions, and finally collapse, coma, and death. Extensive inflammation of the hemispheres of the brain will be characterised by a nearly similar train of symptoms. In the great majority of cases, the two diseases give rise to each other, and are thus combined; it is then extremely difficult, if not impossible, to discriminate between them. Cyclop. of Med., vol. i. p. 284.—T.

move the head from right to left, and from left to right. In these cases it is the will, though irregular, that produces the motion; there are cases, however, where the motions are involuntary; thus, in some patients, the muscles which terminate at the flexor tendons of the fingers, are agitated by violent contractions; hence subsultus tendinum; several present, as a prominent symptom, a tremor which is sometimes general, and sometimes partial. Convulsions, properly so called, are among the most common phenomena accompanying acute meningitis. These are sometimes, though very rarely, general. When partial, they are sometimes confined to the same part; at other times they affect different parts of the body successively. The parts most usually affected with convulsive motions in meningitis are, the globes of the eyes, the eyelids, the face, the lips, and finally the extremities. Tonic spasms, as they are called, are not less frequent than clonic, in the disease now under consideration. Thus permanent flexion of the fore-arm on the arm is often observed. Retroversion of the head, its inclination to the right or left, are sometimes observed in cases of meningitis, as also tetanic rigidity of the neck, trunk, or extremities, trismus, &c.

Under the second class, in which motion is diminished, or altogether destroyed, may be reckoned those numerous varieties of paralysis observed in meningitis. This paralysis may affect the muscles of the eye, of the eyelids, face, lips, or limbs: either one, or several of these, may be deprived of motion. In these different parts the paralysis may be established either slowly, or as instantaneously as the loss of motion succeeding cerebral hemorrhage. The paralysis may supervene from the commencement, or succeed one of the forms of spasms already mentioned; it may alternate with these spasms; it may, in fine, co-exist with them, and we have witnessed more than once one of the upper extremities completely deprived of motion, whilst the other was more or less violently convulsed. There are also some cases in which the paralysis appears and disappears by turns; a phenomenon which will not surprise us, when we have seen, that in meningitis paralysis can exist only when there is compression of the brain. Simple hyperæmia of the pia mater, slight purulent infiltration of this membrane, are capable of producing it, or, to speak more accurately, are capable of producing in the brain that modification, inappreciable after death, which gives rise to it. After having considered in a manner purely nosological the different lesions of motion affecting those attacked with meningitis, we shall now try to establish some relations between these lesions, and the different changes found in the meninges after death. For this purpose we shall pass in review each of the disturbances of locomotive action already alluded to, first mentioning the cases only, where such disturbance existed singly at the last period of life. 1st. With respect to *general agitation*, none of our cases presented this symptom single. MM. Parent and Martinet mention one case of it, in which the pia mater extended over the upper surface of the brain and cerebellum was infiltrated with pus. In another case mentioned by the same authors, in which this

lesion was observed, the meninges extended over the convexity of the left hemisphere of the brain were found red and thickened. 2d. *Partial Agitation.* We have not met one instance of this symptom uncombined with other lesions of motion. MM. Parent and Martinet mention a case in which there was observed a continual balancing of the head to the right and left: this occurred the day before the patient died. The membranes covering the upper surface of the cerebrum and cerebellum were opaque, very red, and thickened. The tissue of the cerebrum, cerebellum, and spinal cord were remarkably dense. These same writers mention a case in which there was a continual moving of the lower jaw, similar to that of mastication. In this the pia mater of the convexity was infiltrated with pus. 3d. *Subsultus tendinum.* Neither has any case occurred to us in which this symptom presented itself singly. MM. Parent and Martinet, however, record four cases, in which it was the only disturbance of the locomotive functions. In one of these cases the meninges were red and thickened nearly throughout their entire extent. In the three others they were infiltrated with pus, either at the convexity, or towards the base; and in two of these three cases, the ventricles contained either a serous or a purulent liquid, with a granulated state of the membrane lining their parietes. 4th. *Trembling of the limbs.* We have not met any case of this occurring singly: but very few cases of it have been mentioned by others; and where it did occur, no particular morbid change was discovered after death on which it could appear to depend. 5th. *Convulsive movements.* These are observed principally in children. Five instances have been recorded in the work of MM. Parent and Martinet of their occurring in adults — in four of these there were convulsive movements of the eyelids, face, lower jaw, and extremities. In three of these four there was found purulent infiltration of the meninges of the convexity of the hemispheres; the fourth presented a membranous concretion, extended over the right hemisphere, and two ounces of serum in the right lateral ventricle. 6th. *Grinding of the teeth.* We have no account of this phenomenon having occurred singly in cases of meningitis. 7th. *Permanent flexion* (contracture) *of the limbs.* In the one case in which this was observed, we found considerable redness of the pia mater extended over the convexity of the left hemisphere of the brain, with injection of the grey substance of the circumvolutions of this side. In the case of a young girl mentioned by Parent and Martinet, who, during the five days previous to her death, presented permanent flexion of the two arms, there was found general inflammation of the arachnoid of the convexity. The meninges at the base were thickened, and a small quantity of pus infiltrated them towards the cerebellum. The ventricles were filled by a turbid serum. 8th. *Tetanic rigidity.* In a considerable number of cases where the prevailing phenomena are rigidity of the limbs, tetanic shocks of different parts of the body, tetanic curving of the trunk to the right or left, trismus, permanent retroversion of

the head, the lesions found after death do not differ in their nature from those just mentioned. Thus we observe different parts of the pia mater more or less injected, purulent infiltration of this membrane, serous or purulent effusions into the ventricles.

In nineteen cases in which retroversion of the head was observed, this phenomenon coincided once with a lesion of the meninges of the convexity and base; twice with lesion of the meninges of the convexity, base, and that of the ventricles; three times with simple lesion of the meninges of the convexity, three times with lesion of the ventricular membrane, five times with lesion of the meninges of the base, and five times with lesion of the meninges of the base and ventricles.

In fifteen cases where tetanic rigidity was one of the prevailing phenomena, whether general, or limited to some part, as to the neck, trunk, extremities, jaw, the lesions, with respect to their seat, were as follow: —

Lesions of the meninges of the convexity - - -	three times.
of the base - - - -	three times.
of the ventricles - - -	three times.
of the base and ventricles -	four times.
of the entire meninges - -	twice.

9th. *Paralysis.* In the fifteen cases of hemiplegia already mentioned, the following alterations were seen: in four the brain was compressed by accidental productions developed in the meninges, which compression constantly occured on the side opposite to that of the hemiplegia, and was made from above downwards. In five of these cases the compression was confined to one of the cerebral hemispheres; in one only (case 2) a tumour appertaining to the dura mater had compressed and wasted one of the lobes of the cerebellum. In this last case also the paralysis was crossed, just as in those cases where the lesion was seated in the cerebral hemispheres, and nothing else was observed but simple hemiplegia, without any other modification of motility. However, before the hemiplegia was established, convulsive movements had taken place in the arm of the side opposite to that of the lesion of the cerebellum; afterwards this limb ceased to have the power of motion; and subsequently the paralysis extended to the lower extremity of the same side. In the subject of our first case, the hemiplegia was established gradually without being preceded by any convulsive movement. There was in this case pressure made on one of the cerebral hemispheres by a fibrous vegetation of the dura mater. In our fourth case the extremities of the right side were both gradually paralysed; the forearm continued a considerable time flexed on the arm, but this flexion ceased at a subsequent period. Blood was found effused on the left side between the arachnoid and dura mater. In one of our cases, where a serous cyst, developed in the pia mater of the convexity, had perceptibly depressed the circumvolutions, the patient had a hemiplegia of very long standing, with atrophy of the paralysed limbs. In six other cases, observed partly by ourselves, and

some by MM. Parent and Martinet, this hemiplegia was seen to coincide with the presence of a thick layer of pus which filled the pia mater of the convexity of the cerebral hemispheres.

Of these six cases there were three in which, though there was hemiplegia, an equal quantity of pus was effused over the two hemispheres, and three others, in which the pus was collected only in the hemisphere of the side opposite to that where the paralysis took place. At first sight, the proportion here seems equal, but a more attentive examination will alter it entirely; for, in one case, at the same time that the pia mater of the convexity of the two hemispheres was infiltrated with pus, the substance of the brain (the left hemisphere), on the level of, and external to, the ancyroid cavity, contained a tubercle, which may be fairly considered to have caused the hemiplegia, more particularly as the latter affected the right side, and had come on progressively. In another of these cases, in addition to the purulent infiltration of the entire pia mater, on opening the body, the inner table of the frontal bone was found a little depressed, and making slight pressure on the brain. Besides, the effusion of pus, which had taken place over the two hemispheres, extended to the base of the cranium on the side opposite to that where the paralysis had taken place. There remains then but one case in which the paralysis having occurred on the left side, the entire pia mater was found infiltrated with pus, without any other complication, and even in this case, it was said, that towards the base the pus was more particularly accumulated on the right side. Thus in these six cases of hemiplegia, with effusion of pus around the encephalic mass, there is not, in reality, one, in which the lesion was not greater on the side opposite to that of the paralysis.

Of these fifteen cases of hemiplegia already mentioned, there remain five in which the principal lesion existed within the ventricles, and of these five there were two, in which both the lateral ventricles were equally affected; in the three others, the only, or principal lesion, existed in the ventricle opposite to the side of the paralysis. In one of the above two, each lateral ventricle contained four ounces of limpid serum; the hemiplegia was on the right side, and seemed to have existed previous to the effusion. In one of the above five cases, the ventricles were distended by a considerable quantity of serum; there was also at the base of the brain a pseudo-membranous exudation, and the central white parts were softened. What was remarkable in this case is, that the paralysis which existed on the left side was but transient. The patient, at first, presented some rigidity of the forearm; slight retroversion of the head; convulsive movements of the eyes and strabismus; then the right commissure of the lips was dragged; the extremities on the left side fell into a state of paralytic relaxation, whilst those of the right side retained motion and sensation; subsequently the mouth became straight, and the left extremities recovered their power of motion. In the fifth of these cases reported by MM. Parent and Martinet, and which they borrowed from Morgagni, the left ventricle was filled with pus, without there existing, either in the brain or its ap-

pendages, any other appreciable lesion. During life, the power of motion was destroyed over the right side of the body.

In a case reported by M. Dance, serum was found in the two ventricles; but in the right there were but three ounces, and in the left five: the membrane lining the parietes of these ventricles was also perceptibly thickened. A paralysis, which went on gradually increasing, affected the extremities of the right side, and the face on the same side. The extremities of the left side presented some tetanic twitches. The nature of the phenomena here seems to have been determined by the inequality of pressure made on each cerebral hemisphere, by the liquid contained in the ventricle. — Instead of hemiplegia, some cases occur in which there is paralysis of only one limb. Thus, in one case where the pia mater, traversed by tubercular granulations, was infiltrated with serum towards the convexity of the brain, the right arm, as well as the right side of the face, were the only parts affected with paralysis. In case 25, where pus infiltrated the pia mater of the convexity, and filled the ventricles, we witnessed, on the one hand, paralysis of the right arm, and on the other hand, paralysis of the left eyelid, which was depressed over the eye; as also of the left cheek, which became passively distended at each expiration. In these two cases the brain was exposed, on both sides, to equal pressure; yet, why do we find effects so different on the two sides of the body? MM. Parent and Martinet relate a case where there were observed alternately, and within a short space of time, at first convulsive movements of the left arm, then paralysis of the right arm, then convulsions in this same right arm; and at the same time that these convulsions exist, the right side of the face was struck with paralysis. What do we find, however, on opening the body? Pus over the entire convexity of the brain only being more abundant on the right. In the numerous cases, where some parts, as one side of the lips, or one of the eyelids, are the only parts paralysed, we find lesion of the same nature and the same extent as in the preceding cases. The parts of the nervous centres which give origin to the nerves of the eyelids and lips, present no appreciable lesion, and the pia mater is found either injected or filled with pus, as in the cases where complete hemiplegia existed.

We shall now consider those cases in which the loss of motion, instead of being confined to any particular part, is, on the contrary, general, and affects, either successively or simultaneously, the two sides of the body. In all the cases of this kind which have occurred to us, when the paralysis of both sides came on before the final struggle, we found, on both sides of the brain, lesions corresponding to this symptom.

The different facts which have now been analysed, with the view of discovering what are the lesions, which, in cases of meningitis, coincide with the different alterations in the power of motion, lead us to a singular conclusion, namely, — that with similar lesions of structure in the dead body, the most varied disturbances in the

function of motion are found to coincide; in the greater number of cases, whether there has been convulsion or paralysis, the structural lesion after death will be the same. Thus, beyond that lesion which the scalpel points out as having its seat in the membranes of the brain, there is, in the brain itself, a modification, not recognisable by the anatomists, which is produced to be sure by the lesion of the membrane, but which, variable in each individual, is the real cause of all the functional disturbances which are seen to supervene.

The different disturbances in the function of motion now passed in review, may take place also in several other cases, where, the membranes being uninjured, the cerebral substance itself is altered. They may develop themselves in those diseases known under the name of fevers, the seat of which we are so often led by the symptoms to place in the brain. In fevers, an in acute meningitis, we often observe *subsultus tendinum*, convulsive motions, oftentimes partial, very seldom general trismus, tetanic affections of the trunk or extremities, permanent flexion of these same extremities, rigidity and paralysis of them, as well as that of the eyelids and lips, trembling of certain muscles, grinding of the teeth. But in the great majority of cases, these phenomena are less frequent, less intense, and less durable. Their existence, however, proves that this same modification, produced in the brain by the irritation of the membranes, may also be produced in it under the influence of other causes, and that, without there being found, after death, any appreciable alteration either in its substance or in the membranes which envelop it.*

* M. Lallemand speaks somewhat decidedly regarding the feasibility of distinguishing arachnitis from inflammation of the substance of the brain by means of the symptoms connected with lesion of the functions of the muscular system; after premising that these symptoms present themselves under two opposite forms, with increase or diminution of action, with phenomena of irritation or of prostration, and having stated that both forms of action are common to arachnitis and encephalitis, he then says — "You see, by these cases, that the spasmodic contractions of the muscles may be produced by an arachnitis, and we shall see presently that attacks of epilepsy, contractions of the limbs, convulsive movements, *subsultus tendinum*, are the ordinary symptoms of affections of this membrane. You must not, however, infer from this, that the arachnoid has a direct influence on the muscles. When this membrane is inflamed, the brain is irritated by the vicinity of the inflammation, its functions are exalted, and consequently those of the nervous system which are dependent on it, therefore also those of the muscular system; thence, convulsive movements, &c.; but as the tissue of the brain is not touched, these spasmodic symptoms are neither accompanied nor followed by paralysis. Thus, though they are sometimes observed at the commencement of inflammations of the brain, they are not sufficient to characterise this disease. But you will remark, that at this period the brain is as yet only irritated as in cases of arachnitis, its tissue not being yet altered; it is not surprising, therefore, that the symptoms should be the same. However, it would be possible even now to distinguish them by this means: when they are produced by the affection of the arachnoid, they usually manifest themselves on the two sides of the body, whilst, when they depend on inflammation of the brain, they most frequently affect only on one side. Besides, they cannot be confounded long; for in the latter case they are soon accompanied by symptoms of paralysis, and very frequently even there is observed from the commencement the most singular mixture of

ARTICLE III.

Lesions of the Intellect.

The intellectual faculties were found altered in the great majority of the cases which we have reported, as may be seen by referring to them. In fifty-four cases of acute meningitis affecting adults, reported by MM. Parent and Martinet, there were only two in which the intellect was not disturbed; whence, we may lay it down that lesion of the intellect is a much more constant phenomenon in acute meningitis, than that either of sensation or motion. Such lesion may present itself under two different forms in this disease, either under the form of delirium or that of coma. The delirium may present the greatest varieties with respect to its nature; in some it is very violent, accompanied with loud cries, and a great development of muscular strength. In others, on the contrary, it is of a silent description, and the patients appear very much prostrated in strength. Sometimes one single idea engages the mind of the patient; sometimes ideas of the most heterogeneous description occupy his thoughts. In some, this disturbance of intellect attains its highest degree from the very commencement; in others it comes on gradually and insensibly. On reviewing, in each case, the numerous varieties of form which the delirium presented, we might arrive at this important conclusion; — that no single one of these various forms characterises meningitis, that there is not one of them which may not be found in the different cerebral irritations which are purely sympathetic, and unaccom-

paralysis and spasmodic phenomena." *Lettre* ii., p. 251; and at p. 277, he says: "To sum up, the affections of the brain, and those of the arachnoid by their influence on the functions of the brain, manifest themselves externally by the lesion of the same functions, that is to say, by symptoms which are related to the perception of the impressions made by external agents, to intelligence, and to voluntary motion. The symptoms of inflammation of the brain present two characters entirely opposite; those of irritation, and those of collapse. On the one hand, exaltation of the intellectual faculties, headache, sensibility of the retina, contraction of the pupil, pains of the limbs, continued or intermittent contraction of the muscles: on the other hand, diminution of intelligence, stupor, somnolence, deafness, loss of sight and of speech, paralysis of the muscles, insensibility of the skin. The former set of symptoms are also observed in inflammation of the arachnoid, and the second in apoplexy. But it is only in inflammation of the brain that they are found combined, because in the former case there is irritation of the brain without alteration of its tissue; in the second there is, from the first, alteration without irritation: it is only in inflammation of the brain that there can be successively irritation and disorganisation. When the paralysis precedes the spasmodic symptoms, it is, that the alteration of tissue precedes the inflammation; that is to say, there is from the first effusion of blood. Finally, when the spasmodic symptoms are wanting, the slow and progressive course of the paralysis will easily render it distinguishable from that which is produced by apoplexy. Thus then in inflammation of the arachnoid we have *spasmodic symptoms without paralysis*; in apoplexy, *sudden paralysis without spasmodic symptoms*; in inflammation of the brain, *spasmodic symptoms, slow and progressive paralysis, unequal and intermitting course.*"

panied with any structural alteration of the membranes appreciable on the dead body.

When once the delirium has developed itself, it may not cease presenting merely alternations of exacerbation and remission; it may also be only transitory. There are some patients in whom this disturbance of the intellectual faculties is but of very short duration; then, at the end of a period, more or less long, it returns; the intermissions become more and more short, and at last, the disturbance becomes continued. In some, the delirium commences only at night, and the clearness of the intellect during the day seems, at first, to exclude the idea of a meningitis altogether. In some, a delirium of several days' duration suddenly disappears a little before death, when the other symptoms become more aggravated. Wherefore, when it is attempted to distinguish the delirium produced by meningitis from the delirium produced by sympathetic irritation of the brain, it is wrong to lay it down that the latter only can be intermittent, as numerous cases prove, beyond all doubt, that delirium arising from meningitis may be accompanied with perfectly lucid intervals. The period of the disease at which the delirium appears, is far from being the same in every case. Very rarely this phenomenon marks the outset of the malady; so that, in the midst of health, when delirium does suddenly come on, it is not at all probable that it is dependent on meningitis. In the great majority of cases, pain of head precedes it; and oftentimes six, eight, twelve, and even fifteen and twenty days pass on between the period at which the pain of head presents itself, and that at which the intellect commences to be disturbed.

Out of forty cases of acute meningitis which fell either under our own view, or under that of others, in which we were certain on the one side of the precise time of the invasion of the disease, and on the other hand of the moment at which the intellect began to be disturbed, we found the delirium to develop itself

1st day	3 times.	7th day	4 times.	13th day	4 times.
2d	1	8th	6	14th	1
3d	3	9th	2	15th	2
4th	3	10th	0	16th	1
5th	3	11th	0	20th	2
6th	3	12th	1	24th	1

Since, with very few exceptions, delirium presented itself as a constant phenomenon in acute meningitis, we must conclude that it may be produced in this disease, whatever be the nature of the lesion of which the membranes are the seat. All the lesions, in fact, observed in our several individual cases, were accompanied with delirium. It is certainly curious to see a mere sanguineous congestion of the pia mater, even in cases where it is partial, a little pus infiltrating its meshes, produce the most serious disturbance in the intellects; whilst a much more deeply seated alteration of the brain, an extensive softening for instance, often exists without giving rise to the slightest disturbance of the intellectual faculties. Is it, as has been said, because the irritation of the membranes re-

acts principally on the most superficial parts of the cerebral circumvolutions, and that the intellect is chiefly seated there?*

We shall next consider, whether for the production of delirium it is a matter of indifference what part of the meninges be affected. In this inquiry we can take into account those cases only in which the delirium continued to the end, single, and without being followed by coma. We have met but twenty-eight cases of this kind occurring either in our own experience, or recorded by others. In these twenty-eight cases, the lesion existed

On the upper surface of the two cerebral hemispheres - -	14 times.
On the upper surface of only one hemisphere - - -	15
On the upper surface of the two hemispheres, and at the base	3
On the upper surface of the two hemispheres, at the base, and in the ventricles - - - - - - - - -	4
At the base alone - - - - - - - - -	0
In the ventricles alone - - - - - - - -	2

Thus in these cases there are nineteen in which the lesion was limited to the convexity of the hemispheres, and only two in which the delirium persisted until death, without there being a lesion of the meninges extended over the upper surface of the brain.

Instead of delirium, patients labouring under acute meningitis may present a state of coma, which sometimes exists from the commencement of the disease, and sometimes comes on only after delirium. This second case is much more frequent than the first, at least in adults.

When a patient dies in the midst of a state of coma, the lesions found in the meninges differ neither in their nature nor seat from those found in cases where life is terminated in the midst of a state of delirium. But then are these lesions different as to their seat? To solve this question, we shall take a review of the facts as they have been observed.

Out of sixty-one cases, in which death supervened in the midst of a comatose state, which existed either for several days with or

* On the subject of delirium, as connected with arachnitis, Lallemand makes the following remarks: — "Delirium is in general regarded as a symptom of inflammation of the brain; its absence might induce one to doubt of the inflammatory nature of softening of the brain. But it is, on the contrary, a stronger reason for this opinion; it will be no difficult matter satisfactorily to prove that delirium is *never* observed in inflammations of the brain which are exempt from complication, that this symptom belongs *specially* to inflammations of the arachnoid, that persons have been led into error by the very numerous cases in which the affection of the arachnoid preceded that of the brain. I admit that it seemed natural to attribute the delirium to inflammation of the brain, rather than to that of the arachnoid; but still an error was committed. Do not, however, suppose that I would make the arachnoid the seat of the delirium; every symptom is the alteration of a function, and cannot be produced but by the organ which executed this function; but I have already said that the affections of the arachnoid influence the functions of the brain in the same manner as the affections of the pleura influence the functions of the lung. It is impossible that the arachnoid should be inflamed without the surface of the brain in contact with it being also affected; but its tissue not being altered, there merely results from this vicinity an exaltation in its functions." — *Lettre* ii., p. 246.

without preceding delirium, or at least for twenty-four hours, we found the lesion to exist

On the upper surface of the two cerebral hemispheres - -	11 times.
On the upper surface of but one hemisphere - - -	6
On the upper surface of the two hemispheres, and at the base	5
On the upper surface of the two hemispheres, and in the ventricles	13
On the upper surface of the two hemispheres, at their base, and in the ventricles - - - - - - - - - -	8
In the lateral ventricles - - - - - - - -	9
At the base of the brain - - - - - - - -	4

Hence it follows that coma may come on at the different periods of acute meningitis, whatever be the part of the meninges affected. We cannot, therefore, lay it down with some authors that delirium appertains exclusively to meningitis of the convexity, and that coma is peculiar to meningitis of the base. We think that, whatever be its seat, meningeal inflammation may have the effect of determining in the brain at first a period of excitement announced by delirium, then a period of collapse, either real or apparent, which is manifested by coma. In the great majority of cases which terminate in death these two periods exist. However, in some instances, the period of excitement continues beyond the usual time, and such persons die before the coma has supervened. In others, on the contrary, the signs of excitement are very transient, scarcely ever apparent, and the state of coma declares itself, without having been preceded by delirium, properly so called. There are, in fine, some cases in which the coma is the first symptom; individuals who a little before were in a good state of health, fall down suddenly deprived of consciousness, sensation, and motion. Our 20th and 21st cases present examples of this apoplectic form of the disease. In the two individuals who form the subject of them, nothing else was found but an enormous distension of the ventricles by limpid serum. Does this form, which differs from all the others, belong exclusively to acute dropsy of the ventricles? It is possible that the mere effusion of serum around the brain, which infiltrates the pia mater, and suddenly compresses the nervous mass, may also produce this apoplectic form; but in all the cases of this kind hitherto observed, the ventricles were the principal seat of the effusion. To the cases already cited, we might add another recently published by Dr. Martin Solon; it was that of an old man, seventy-six years of age, labouring under organic disease of the heart. The dropsy symptomatic of this affection had gradually disappeared, and the patient appeared to be doing very well. He got up one morning out of bed to go to the water closet — returned quickly to his room with his face much flushed, endeavoured to make towards his bed, when he fell down suddenly, and expired without uttering a word. On opening the body, the sinuses were found gorged with blood, the surface of the brain pale, the arachnoid transparent, not thickened, raised by a serous, limpid, colourless liquid, which infiltrated the pia mater, and might be estimated at about five or six

ounces. The lateral ventricles were also found filled with a serum equally limpid and transparent; neither their parietes, nor the central white parts presented any softening. In the chest was discovered an organic affection of the heart, namely, dilatation of its cavities, a thinness of its walls, and a cartilaginous state of the tricuspid valve.

Thus, then, in proportion to the greater or less rapidity with which a serous effusion takes place, whether simultaneously into the ventricles or around the brain, or solely within the ventricles, very different forms of disease may present themselves. If in a very short space of time, a very large quantity of serum has been exhaled by the arachnoid, the result may be a morbid state similar to that which is produced by a very large cerebral hemorrhage, in other words, apoplexy. This is serous apoplexy, an affection which we consider the moderns have been very wrong in erasing from their nosological systems. — (See case 20.) If the serum accumulate somewhat less rapidly, either in the external pia mater, or in the ventricles, the symptoms are then observed to be such as accompany every irritation of the meninges. — (See case 19.) If the accumulation of serum takes place slowly, there may result a third form, of which we have an example in case 21. Here the power of motion remains unimpaired, whilst the intellect becomes weakened only by degrees.

To conclude: in those cases where the disturbance of the intellect depends on an affection of the meninges, the cause of this disturbance can no more be referred to any specific alteration, than that of motion or sensation can, and the diversity of the lesions of intelligence, as well as those of sensation and motion, can only be accounted for by referring it to the different susceptibility of the brain to impression.

CHAPTER III.

DISTURBANCES OF THE FUNCTIONS OF THE ORGANS OF NUTRITIVE LIFE.

Several of these disturbances are very important to be considered, when we wish to establish the diagnosis of meningitis, and to distinguish it from other diseases in which nearly the same functional disturbances of the brain are observed. On the part of the digestive organs, for instance, there appear in a great number of individuals attacked with acute meningitis very remarkable morbid phenomena, which supervene, but much more rarely in cases where the intestine is the seat of inflammation more or less intense. The circulation is also disturbed in certain cases in so particular a way that, by combining the signs furnished by it with the signs afforded by the disturbance of the cerebral functions, we may be able to attain with certainty the diagnosis of meningitis.

ARTICLE I.

Lesions of the Functions of the Digestive Apparatus.

In a considerable number of individuals attacked with meningitis, the digestive tube does not present during life any appreciable functional lesion. In others it is the seat of disturbances more or less severe; in this latter case, it is an object to inquire whether these disturbances are merely the result of an abnormal influence exercised by the nervous centres on the digestive passages, or whether they are connected with an affection of these same passages, which affection has complicated the disease of the encephalic membranes.

When the meningitis was not complicated with any other affection, we found the tongue always to preserve its natural state; it is broad, moist, free from any redness, and sometimes even paler than usual; most frequently it is covered with a light white coating. This was the result of the analysis of thirty-seven cases, in which the state of the tongue was carefully noted. Among these thirty-seven, there were twenty-four in whom the tongue preserved the state above mentioned during the entire course of the disease. Now of these twenty-four cases, sixteen of which came under our own observation, and the rest under that of M. Dance, we find there were fourteen in whom the stomach presented nothing unnatural after death, the remainder of the digestive canal also being perfectly sound, with the exception of case 7th, where the lesion found was on the decline, and was connected with a disease, the symptoms of which ceased to exist several days before death. — (See the remarks subjoined to this case.) — There remain ten then in which, the tongue having preserved its natural appearance till death, the stomach, however, did not appear to be in its physiological state. But the lesions presented by it were such as, under ordinary circumstances, do not exercise any influence on the state of the tongue.

We shall now consider the thirteen cases in which the tongue lost its natural appearance. It was then red, dry, cleft, brown, encrusted or covered with a mucous coat, much thicker than the thin white coat already mentioned, which cannot, in our opinion, be considered a morbid state of the tongue. Now of these thirteen cases there was not one which presented the gastric or intestinal mucous membrane entirely exempt from lesion. Sometimes this lesion was of a serious character, and of that class of lesion which usually coincides with a modification in the state of the tongue; sometimes, on the contrary, the lesions found in the stomach were of a description similar to that of the lesions which we have already seen to coincide with a natural state of the tongue. It may be here remarked that acute inflammations of the bladder oftentimes modify very perceptibly the state of the tongue. — (See case 17.)

In recapitulation, it may be asserted that every time when, in an

individual who has died of an affection of the meninges, we found on examination no morbid state either of the digestive or urinary passages, the tongue never lost for one instant its natural state; it also preserved it in several cases where the lesions found in the stomach were of the nature of those which most frequently do not modify the state of the tongue; and, in fine, the tongue has scarcely ever lost its physiological state, except in cases where the necropsy pointed out disturbances which are known to coincide ordinarily with a modification, more or less perceptible, of the state of the tongue. Every time then that, in a patient who exhibits several of the signs of encephalic irritation, the tongue shall be found red, dry, brown, &c., we shall be disposed to consider either that this irritation is but the sympathic product of another disease, or else that the latter complicates it.* Thus among the numerous causes which may modify the state of the tongue, we must not consider inflammation of the meninges. But during its progress, or simultaneously with it, different morbid states may be developed, which may or may not be appreciated by morbid anatomy which may bring on with them a modification in the natural state of the tongue.

In most of the cases where meningitis was not complicated with any affection, the thirst did not seem to us to be very great. The loss of appetite oftentimes manifested itself at the onset of the disease; yet in some cases the appetite still remained, even when the intense headache, so frequently marking the commencement of the disease, already existed for several days.

In some cases the epigastrium was the seat of pain sufficiently acute to be increased by pressure, and we have not seen in any of the cases where this pain existed, that there was a complication of gastritis. This pain in the epigastrium manifested itself in most cases at a period not far removed from the commencement of the malady. We never observed it to become very intense, nor is it to be compared in this respect to the pain of head.

We are now come to one of the phenomena which best characterise certain cases of meningitis, we mean vomiting and nausea. Here, as in several other circumstances, the stomach is the seat of the phenomenon; but its cause is elsewhere. Vomiting, or at least nausea, very frequently accompanies acute inflammation of the meninges: these phenomena show themselves almost always in the first stage of the disease, and often mark its commencement. Sometimes they, not being oftentimes repeated, attract but little attention; and after about twenty-four or thirty hours, they do not return. Sometimes, on the contrary, they continue for several days, and occasionally during the entire course of the disease.

* As there is no rule without an exception, we may state here, that in some cases reported in the volume on *Diseases of the Abdomen*, where the prevailing symptoms were those of *ataxic* fever, the natural appearance of the tongue might incline one to believe in the existence of meningitis; and still such was not the case, and the entire disturbance, that at least which anatomy could appreciate, was seated in the intestine.

Simultaneously with this vomiting, it often happens that no other symptom is observed connected with the digestive passages; the tongue remains natural; the epigastrium is free from pain; the entire abdomen is perfectly soft; and, in cases where death has supervened, whilst this vomiting still existed, the stomach was frequently found in the soundest state. A striking example of a modification of function, which is explained to us by no change in the texture of the organ.

If we now inquire whether the frequency of the nausea and vomiting is dependent on the seat of the meningitis, we shall find that these symptoms are observed in nearly an equal proportion, whether it be meningitis of the convexity, or that of the base, or that of the ventricles. Thus the seat of the disease has no influence on the production of the nausea and vomiting. The same may be said of the nature of the lesion. Why, then, in two cases where the apparent lesions are the same, does vomiting take place in one, and not in the other? Anatomy cannot inform us. Thus, every time that we wish to ascend to the cause of the inconstancy of the symptoms of meningitis, we cannot account for this inconstancy by the difference of the lesions of the meninges; and we are obliged to admit that, in the brain itself, there are some functional modifications, the secret of which has not yet been found out by the skill of the anatomist. Vomiting, when it presents the characters now mentioned, when, for example a natural state of the tongue coincides with it, is a valuable sign to distinguish, at the commencement, the nervous symptoms which depend on idiopathic irritation of the encephalon from those which are connected with inflammation of the intestinal follicles. We shall see, in the volume on *Diseases of the Abdomen*, how rare vomiting is in the latter case. Such are the principal functional disturbances which are observed in reference to the stomach in cases of meningitis. With respect to the intestines, properly so called, they present but very few disturbances. Thus, in all the cases of meningitis exempt from complication, which have fallen under our own observation, or have been mentioned by others, we have found the abdomen soft and free from pain in all its parts; the stools are few; meteorism takes place only when the intestine itself is affected; and this uniform absence of meteorism is again one of the characters by the help of which we shall be able to distinguish a meningitis from a severe attack of fever; after which we find, in the *post-mortem* examination, no other lesion except in the digestive tube.

ARTICLE II.

Lesions of the Circulation.

The disturbances produced by affections of the meninges in the circulatory apparatus may be manifested, first, in the motions of the heart; secondly, in the manner in which the arterial expansions

are performed; thirdly, in the capillary circulation; fourthly, in the qualities of the blood itself.

The heart, examined during life, presented to us no other modifications except those announced by the pulse. After death it presented nothing particular, with the exception of one individual, who died with symptoms of apoplexy, and in whom the ventricles were found dilated by a great quantity of serum. This person had an organic affection of the heart.

The arterial expansions presented modifications to us with respect to their frequency, their strength, and their rhythm. From a very considerable number of cases of meningitis, in which the state of the pulse, with respect to frequency, was carefully noted, we feel warranted in asserting, that nothing is more variable than the state of the pulse in cases of meningitis.

If, in a considerable number of patients, it be perceptibly accelerated, in others the arterial pulsations are not more frequent than in the natural state; whilst in others, again, they become slower than ordinary. We may note, also, that the proportion of the cases in which the pulse remains free from frequency, or becomes slower, is more considerable in acute affections of the meninges than in the equally acute affections of the thoracic and abdominal viscera. Slowness of the pulse becomes again a sign of considerable importance in aiding us to distinguish a real affection of the meninges from other morbid states which may resemble it. We may here refer to some cases in which the meninges, becoming affected during the course of another affection, the commencement of this complication was marked by an extraordinary change in the pulse, which having till then been very much accelerated, suddenly lost its frequency. From the analysis of several cases, we have arrived at the conclusion, that the absence of frequency in the pulse, no more than its slowness, depends neither on the seat nor nature of the meningeal inflammation; yet our experience induces us to think that this state of the circulation is more frequent when the ventricles are distended by a considerable quantity of liquid; but we have also seen it in cases where the ventricles were perfectly sound. From the consideration of several cases we may venture to state, that the cases of meningitis, in which the pulse was accelerated, seem to be more particularly cases of inflammation of the meninges of the convexity; and it was almost exclusively when we found on the dead body lesions characterising the inflammatory state that this acceleration was observed. The pulse, considered with respect to its strength, presents no constant character; in some cases it is hard, full, and vibrating; whilst in others it is small and concentrated from the commencement of the affection. It generally becomes weaker and more compressible during the period of coma. Irregularity in the rhythm of the pulse has been observed in some meningeal inflammations; but pathological anatomy is as unable to account for such a phenomenon as for its strength or weakness, frequency or slowness. The capillary circulation undergoes certain modifications in persons labouring

under meningitis. These are recognisable principally in the conjunctiva and face; the commencement of the disease is frequently accompanied by great redness of both these parts. This state is sometimes succeeded by great paleness; sometimes this paleness exists from the commencement of the attack, and it continues to the very last moment of life; and this is observed not only in those cases where a copious effusion of serum is found after death, but also in cases where dissection detected proofs of very active inflammation in the membranes of the brain, such as infiltration of the pia mater with pus, flocculent serum in the ventricles, false membranes at the base of the brain. The temperature of the skin varies considerably in the different forms of meningeal affections; oftentimes it is increased; frequently also, it remains perfectly natural in all the phases of the disease. It is not uniformly raised even in those very cases where, after death, pus is found around the brain.

ARTICLE III.

*Lesions of Respiration.**

This function does not always remain in its natural state in persons labouring under meningeal affections. The disturbances which it undergoes appear to depend on the influence which the affection of the nervous centres exercises over it; since, after death, we do not detect in the lungs any lesion which can account for the modifications observed in the respiration during life. We know from experience, however, that the cases in which the respiration remained in the natural state are much more numerous than those in

* With respect to the modifications which the several functions, &c., undergo in meningeal inflammation, and in order to assign the real cause on which such modifications depend, the following passage is here annexed from the Cyclopædia of Practical Medicine, vol. i., article "Brain:" — "The brain confessedly presides over all the phenomena which are attended with consciousness, and over every act which is influenced by the will: it is the organ of intellect, and the centre of sensation and of voluntary motion. Moreover, through the pneumogastric nerve it influences directly the functions of digestion and respiration, and indirectly (through the respiratory apparatus) that of the circulation. Experiment also demonstrates its intimate connexion with the regulation of animal temperature. Now if we note the symptoms attributed to inflammation of the arachnoid membrane, or look over the catalogue of them as enumerated by different writers, we shall find that they are but so many lesions or disturbances of one or more of the cerebral functions; and as such they must arise from an affection of the organ itself, which holds these functions in dependence, and not of the investing membranes, which cannot exert on these functions any direct control. Thus when, in the summary of the symptoms of arachnitis, we find delirium, spasm, and rigidity of the muscles, convulsions, vomiting, stupor, coma, contraction or dilatation of the pupils, with strabismus, we must refer them to an alteration in the function or structure of some part of the cerebro-spinal mass, and not of its investments merely. The arachnoid and pia mater are so simple in their structure and function, that we can scarcely assign to inflammatory action, when set up in them, any other indication except pain or headache." — T.

which it was in any way modified. There are, however, very few cases in which the respiration did not become embarrassed and stertorous during the few hours immediately preceding death. In some, to be sure, we see life suddenly terminate without any difficulty whatever in the respiration. Those cases in which the respiration continued natural, presented all the possible varieties of lesion of the meninges, whether with respect to their nature, or to their seat. With reference to the cases in which the respiration was modified, nothing particular was observable in the morbid changes in the meninges; so that here again the anatomical data are completely insufficient to explain the variable influence which the irritated or compressed brain exercises over the action of the respiratory apparatus. Some cases to be presented in a subsequent volume of this work, prove that, without any appreciable lesion of the brain or its membranes, the respiration may exhibit all possible modifications; for this it is only necessary that any cause whatever should disturb the innervation either temporarily or permanently.

SUPPLEMENT.

*Spinal Meningitis, or Inflammation of the Membranes of the Spinal Marrow.**

Inflammation of the membranes of the cord is seldom found limited to the extent of the spinal canal; most frequently the membranes of the brain are found at the same time inflamed. This inflammation is characterised on the dead body by a yellowish, opaque, membraniform exudation, varying in thickness and consistence, sometimes continued the whole length of the cord, sometimes forming detached and separate patches. This exudation is usually situated between the arachnoid and pia mater of the cord: so that, on cutting into the dura mater, the spinal cord appears at first sight increased in volume, and changed into a yellowish substance: such is uniformly the seat of this puriform layer, which is always thicker in the posterior than in the anterior part of the cord. When this concrete substance is removed, we perceive that there exists at the same time thickening and injection of the sub-arachnoid cellular tissue, which is evidently inflamed, whilst the arachnoid itself presents neither injection nor opacity. There is also usually in the lumbar

* The above Supplement has been compiled from the last edition of Ollivier's Work on Diseases of the Spinal Cord; such addition was considered necessary to render the pathology of the cerebro-spinal system complete in this first part. — T.

portion of the spinal canal a sero-purulent liquid, more or less turbid, and in rather considerable quantity.

All these details are the more particularly insisted on, inasmuch as it is generally said that the arachnoid is then inflamed and its cavity filled with purulent matter. This assertion is false, and arises from want of due attention in making the examination. The purulent exudation is always subjacent to the arachnoid, which ordinarily retains its smooth and polished appearance; and when the cavity of this serous membrane is covered with similar concretions, a thing which rarely happens, there is always at the same time a purulent exudation between the pia mater of the cord, and the corresponding arachnoid reflexion, that is, in the space filled in the normal state by the spinal liquid. The ventricular parietes of the encephalon are also frequently found covered by a similar pseudo-membranous layer.

Acute spinal meningitis does not always leave the same traces in individuals who die in consequence of it. Sometimes it gives rise to acute dropsy;* the membranes have a red, violet tint, evidently caused by the injection of the sub-arachnoid vessels, and the serous reflexion is rendered opaque by the thickening of the cellular tissue to which it is immediately contiguous.

At other times isolated points are seen more or less injected and red, which are evident traces of local inflammation; they are seen particularly when there is caries of one or more vertebræ, opposite the altered part of the spine. These circumscribed inflammations are seldom observed when there is no alteration of the bones. Sometimes the cavity of the membranes is filled with fluid blood, the product of an accidental exhalation. We have not always met, in persons who have died after spinal meningitis, the traces of this inflammation within the membranous envelopes of the cord. Bergamaschi† cites an instance where there was only found a serous effusion between the bony tube of the spine and the dura mater; he mentions another instance, as does also Lallemand,‡ where a considerable effusion of blood was seen in this part.

The vessels of the coverings of the cord are, in general, more or less injected, but particularly those of the spine and of the pia mater. Sometimes the substance of this organ is softer than in the natural state; sometimes it presents no appreciable change; sometimes it is unusually hard (Bergamaschi); at other times it is evidently softened. In a word, inflammation of the membranes may exist with or without inflammation of the substance of the spinal marrow.

Hitherto anatomical research has not been able to discover any vessels in the arachnoid, and yet all authors speak of its inflammation; but it is evident that the vessels which are subjacent to this membrane have been considered as belonging to it. The red tint

* J. Frank, Prax. Med., etc., de Rachialgite, p. 80.
† Giornale della Soc. Med. Chir. di Parma, Giugno, 1810.
‡ Deuxieme Lettre sur L'Encephale, Obs. No. 30, p. 305.

and thickening which it then presents, are owing, as I have already said, to the injection of these same vessels, and to the infiltration or thickening of the sub-serous cellular tissue.

The arachnoid, says Beclard,* has the same structure as the other serous membranes, but it has a very soft consistence; it is extremely thin, and its texture cannot be determined; it appears homogeneous, we observe no vessels in it, even when in a state of disease. — Most of the morbid phenomena attributed to it take place in the tissue lying on the pia mater; it seems, in fact, to form a separate genus altogether. Such is the cause of the opaque and whitish appearance which the cerebral arachnoid often presents in a part of its extent. If this membrane be examined with attention in these different points, it will soon be ascertained that its greater density, owing probably to a chronic inflammation, is produced by the thickening of the cellular tissue uniting it to the pia mater, to which it is then sometimes found closely adhering. The inflammation which determine these changes in the cerebral arachnoid has been most frequently of a chronic nature; a thing which is seldom observed in spinal meningitis, the progress of which is usually rapid, whence it is that such opacities are not often observed in the vertebral arachnoid.

The most ordinary effects of chronic spinal meningitis are adhesions between the serous reflexion lining the dura mater, and that corresponding to the pia mater of the spinal marrow. This has been frequently observed, particularly in inflammation of those membranes consequent to a lesion of the vertebræ. Another alteration of the spinal arachnoid, and one which is peculiar to it, consists in the presence of cartilaginous plates, marked with roughnesses on the side of the arachnoid cavity; the primary cause of their formation is not at present easily determined; they are found, however, pretty often in persons who have presented, during life, phenomena resulting from a chronic irritation of the cerebro-spinal centre.

Partial injections of the spinal arachnoid have been several times observed, which appeared to be seated in the arachnoid itself; but more attentive examination showed that the injected vessels lay beneath the serous membrane. These partial injections sometimes form small red pointed patches, which seem to be in the substance of the serous reflexion, which then presents a real thickening, and which is then often united to the fold lining the dura mater by more or less cellular filaments. M. Ribes (Dict. des Sc. Méd., art. *Vertebre*) also thinks that the seat of the inflammation is not in the spinal arachnoid, but in the dura mater, which receives a great number of vessels; in the pia mater, which also contains several; and in the vessels which, from this membrane, penetrate into the substance of the spinal marrow. Those cases wherein a great quantity of blood or serum has been found between the bony tube of the spine and the dura mater, support this opinion. Be that as it may, the

* Anat. Gén.

least equivocal traces of spinal meningitis consist in a puriform exudation situate between the pia mater and the arachnoid.

SYMPTOMS OF SPINAL MENINGITIS.

Spinal meningitis is often obscure at the commencement, and, like many other diseases, announces itself only by a feeling of uneasiness and fatigue in the limbs; there exists, however, at the same time constipation, dysuria, or even a retention of urine. The patients then complain of a slight pain in the back, often in the lumbar region only, which pain is at first dull, and which extends to the lower extremities. The existence of phenomena dependent on a cerebral affection often increases the difficulty of the diagnosis at the commencement of the complaint: we have, in fact, seen that inflammation of the membranous envelopes of the spinal marrow is seldom limited to the spinal canal; most frequently those of the brain are also inflamed in a variable extent; symptoms of cerebral meningitis present themselves in many cases together with those of spinal meningitis. But on separating the former from the latter, and on bringing together the examples of this inflammation, we find that there are two symptoms which might be considered as pathognomonic signs of acute inflammation of the membranes of the cord, since they are, if not always, at least most frequently combined.

The first consists in a general contraction of the muscles of the posterior part of the trunk, which may vary from simple muscular rigidity to the most violent contraction, which then produces retroversion of the head and trunk, whence arises a real opisthotonos, and the spine forms a species of inflexible arch down its entire length. We have seen this curve to exist in cases where the autopsy proved that the inflammation was limited to the spinal meninges alone, those of the brain being altogether exempt from inflammation; so that we may consider this symptom as positively indicating the inflammation of the membranes of the cord. However, it must not be forgotten that in meningitis at the base of the brain, the cervical part of the spine is sometimes curved backwards; but the rest of the trunk retains its natural straightness and flexibility.

We see that this tetanic contraction manifests itself principally when we wish to make the patients move, and it even happens that it does not exist when the body is in a state of complete rest. The muscular rigidity is seated principally in the trunk, without the extremities participating in it; these, however, are often equally affected. The movements, which are in some measure restrained by the pain, have less force, but they are not paralysed, unless there be some alteration of the brain which produces this effect.

The second symptom is a pain, more or less acute, in the dorsal region; it seems to commence in general from the point where the inflammation is most intense, and there also it is always most acute. It, as well as the muscular rigidity, presents remissions, and sometimes even it disappears in order to manifest itself anew. It

is marked also by irregular intermissions. The pain may exist without any perceptible muscular contraction; but it is ordinarily accompanied by this phenomenon, or by convulsive motions, and uniformly the rigidity of the muscles manifests itself immediately, or a little time after the pain has appeared. According to some authors, this pain is increased by pressure. I have not, however, observed it. . . . . The violent pain complained of by patients along the spine is a constant symptom of spinal meningitis; sometimes it darts rapidly from the point primarily painful to the entire extent of the back; its radiations are extended to the limbs, and the slightest pressure, or a mere displacement, makes the patient scream aloud. This morbid exaltation of the general sensibility is an almost constant phenomenon in spinal meningitis, and there is commonly observed no diminution of this property, a circumstance which assists in distinguishing this inflammation from myelitis, which is ordinarily accompanied with a more or less complete abolition of the sensibility. Thus this sign may serve to characterise inflammation limited to the membranes of the spinal cord, since in the one the sensibility is exalted, and in the other it is weakened or destroyed.

The combination of the two symptoms just described characterise in a manner acute inflammation of the spinal meninges, for in all the cases in which both were observed, the autopsy showed an inflammation of the entire extent, or of the greater part of these membranes, and sometimes, but rarely, the inflammation occupied but a very limited space. To these phenomena we must add more or less acute pains in the limbs, greater or less rigidity of these same parts, trismus, and sometimes convulsions. Respiration is difficult and panting: this latter symptom is rather frequent, and is readily accounted for from the nature and seat of the disease. The pulse, which at first undergoes but little change, always preserves its regularity, then becomes more and more frequent, and loses somewhat of its strength; it is small, concentrated, whilst the movements of the heart are strong and rapid. Ordinarily copious sweat covers the patient during the attack, when the tetanic contractions are intermittent. With respect to the paralysis and the convulsions, they may likewise depend on inflammation of the cerebral membranes, which so often exist at the same time, or on that of the brain, and then the face may be red, the eyes bright and animated, thirst intense, deglutition difficult, delirium more or less violent, &c. Tetanus has been considered as the result of inflammation of the spinal membranes, because it has been observed several times in persons who have died of this disease; but as it has happened just as often that no trace of inflammation was detected in this case, nothing can be inferred on that subject. Some physicians think that this inflammation exists principally in traumatic tetanus. However, if this inflammation is not the alteration which constitutes tetanus, it is nevertheless true that it is occasionally observed, and such coincidence should always be remarked.

With the exception of the retention of urine, and of the constipation which always exist in spinal meningitis, no very particular disturbance is observed in the functions of the other organs of the abdomen, nor in those of the thorax, and yet we have seen that there are most frequently traces of inflammation more or less intense in the respiratory and digestive apparatus. I shall observe, that the abolition of the functions of the bladder always continues in the same degree from the commencement to the end, whilst the same thing does not happen with respect to the intestine, the fæces being passed naturally at the close of the disease. The movements of the heart appeared to be perceptibly influenced but on one occasion; but the pulse has always increased in frequency, and diminished in strength. As for the respiration, it is uniformly difficult and incomplete.

With respect to the causes under the influence of which spinal arachnitis may develop itself spontaneously, it is often very difficult to determine them. Persons subject to rheumatic affections appear to be more exposed to this inflammation. It may also be brought on, according to Vogel, by the suppression of the menstrual or hemorrhoidal flux. It is often consecutive on cerebral meningitis. Violent contusions, pricking or laceration of the spinal envelopes, changes produced in the vertebræ, may also bring on this inflammation, as likewise violent exertions of any kind. With regard to the treatment, recourse must be at once had to copious general bleeding, particularly in the young and vigorous; to this, which is to be repeated as occasion may demand, must be joined local bleeding, by means of leeches, or cupping, along the entire of the vertebral column. The cold affusion, and the application of ice, which are so advantageous in cerebral meningitis, must be equally so in an inflammation seated in a similar part. When the inflammation is chronic, rubefacients and blisters have been found serviceable. The same may be said of the cautery, and of moxas. With this should be combined emollient and gently laxative drinks; — laxative enemata may also act advantageously, as derivatives. Distension of the urinary bladder should be prevented by catheterism frequently in the course of the day. — *Ollivier, Traité de la Moelle Epinière*, vol. ii., chap. vii., &c. — TRANSLATOR.

SECOND BOOK.

DISEASES OF THE BRAIN.

FIRST ORDER.

CEREBRAL CONGESTIONS.

A GREAT number of morbid states, differing very much from each other with respect to the functional disturbances accompanying them, have been referred to congestions or hyperemias of the brain; which states sometimes give rise to all the symptoms characterising a severe attack of apoplexy, and are capable even of producing death more promptly than real cerebral hemorrhage, whilst sometimes they simulate acute inflammation of the meninges, &c. The cases now about to be given are instances of these varied forms of cerebral hyperemia; they will also show how different are the symptoms which may be determined by one and the same lesion, whether in regard to the differences which it presents in its intensity, in its progress, in the greater or less rapidity of its production, or with regard even to the difference of disposition in the individuals affected by it.

SECTION I.

CASES.

CASE 1.—Disease of the heart of long standing—Sudden loss of consciousness and motion—Speedy death—Remarkable injection of the substance of the cerebral hemispheres.

A woman, fifty-three years of age, entered the hospital Cochin, in the month of March, 1829, presenting the following state:—Face flushed; lips purple; œdema of the lower extremities; ascites; speech uttered with panting; orthopnœa; pulsations of the heart tumultuous, repelling the ear, perceptible in almost all the parts of the chest, except on the right posteriorly; pulse sunk, contrasting by the smallness of its beats with the strength of those of the heart, regular in other respects, and not frequent. Cough of long standing, dry sonorous rattle in different points of the chest; digestive functions duly performed; no perceptible disturbance as far as re-

gards the nervous centres. This woman was considered as affected with hypertrophy of the parietes of the heart, with dilatation of its cavities; she was bled, and subjected to the use of digitalis.

Under this treatment, aided by suitable regimen and rest, the dyspnœa and ascites had diminished a little, when one day, on getting up out of bed, she complained of seeing every thing turn around her; she scarcely uttered these words, when she uttered a loud scream, put her hand towards her head, and fell down, deprived of consciousness, which she did not recover during the remainder of the day, and died that night.

Post-mortem — Cranium. — The arachnoid of the convexity remarkably dry. The grey substance of the convolutions has a well marked rose-coloured tint. The medullary substance, which forms in a great measure the nervous mass situated over the ventricles, is traversed by a very great number of red points, each of which constitutes the orifice of a vessel gorged with blood. The ventricles contain very little serum; the optic *thalami* and *corpora striata* less injected than the rest of the hemispheres. The sinuses of the dura mater were gorged with liquid black blood.

Thorax. — The lungs were gorged with an enormous quantity of frothy serum, which flows out in great quantity at every incision made in their parenchyma. Heart very large; its parietes thickened, and its cavities dilated. Its different orifices free; at the base of one of the aortic valves are some slight ossifications, which present no obstruction to the freedom of its action. The aorta presented no other lesion than some cartilaginous and bony patches incrusting its parietes.

Abdomen. —Slate-coloured tint and enlargement of the papillæ of the gastric mucous membrane over a great part of its extent; liver gorged with blood; spleen small and dense.

Remarks. — Here was a case in which, before the *post-mortem*, one might have supposed great cerebral hemorrhage had taken place, the patient having presented the symptoms characterising a violent attack of apoplexy. The scream she uttered, her putting her hand towards her head before falling, indicated that she experienced a painful sensation in the brain. Such a cry does not usually precede an attack of apoplexy, it being rather connected with epileptic fits. After once falling without consciousness, she remained deprived of sensation and motion, and at the end of some hours she died in the way that apoplectics generally do; yet all that was found in the brain, was a greater than ordinary injection of the two hemispheres. This certainly is a very slight lesion to account for such violent symptoms. It is probable that a similar injection takes place momentarily in persons who are momentarily seized with giddiness and other signs of cerebral congestion, without any thing fatal resulting from it. The same injection is also, no doubt, the only lesion in the brain in those cases where all the symptoms of an attack of apoplexy come on, which, after continuing some hours, entirely disappear, without leaving any trace of their existence. It is

not r robable that in such circumstances hemorrhage takes place; for the blood once effused into the cerebral pulp could not be so soon absorbed. We have seen cases of this kind in which complete hemiplegia, preceded and accompanied by loss of consciousness, and by stertorous respiration, likewise disappeared after the lapse of some hours. In those cases where loss of motion and sensation, limited to one side of the body, seems to indicate a more deep-seated lesion in the cerebral hemisphere of the opposite side, is it still possible that there may be but mere cerebral hyperemia without any escape of blood from its vessels? The following will prove that such may be the case:

Case 2.—Attack of apoplexy supervening on a chronic affection of the thoracic and abdominal organs—Hemiplegia—Death two days after this attack—Considerable injection of the substance of the cerebral hemispheres—No other lesion in the nervous centres.

A man, seventy-two years old, entered the *Maison Royale de Santé*, the 7th July, 1830. Six months before he had been operated on for hydrocele. When eighteen years old he had a copious hemoptysis; more than twelve ounces of blood had been expectorated by him in the space of fifteen hours. Since then no return of the hemoptysis, but all his life he was subject to a cough. When we saw him, we discovered, on examining the abdomen, a considerable tumour, which could be traced into the right hypochondrium, the flank of the same side, to the epigastrium, to the level of the umbilicus, and even into the left hypochondrium: this tumour appeared to us to appertain to the liver; it could be pressed without causing pain. For the last two months only the appetite was lost; the patient had neither thirst, nausea, nor vomiting; the stools were for a long time frequent and of little consistence; the tongue was covered with a thick, somewhat viscid white mucus; there was an evident fluctuation in the addomen; the legs were œdematous, and the bursæ seemed infiltrated with a considerable quantity of serum. A very loud respiratory murmur, without any rattle, extending over the entire chest; pulse was frequent; skin hot; a copious deposition of rosacic acid appeared in the urine. During the two following days the tongue became red and dry. On the 10th, at about three o'clock in the afternoon, new symptoms suddenly supervene; the patient loses consciousness all at once; and at our visit on the next morning, we were told that the preceding night he had had an attack of apoplexy. His state was then as follows: — He lies on his back; face much injected; eyes closed; on raising the eyelids, we observe the globe of the eye move slowly; on bringing the finger near it, he quickly depresses the eyebrows; the pupils moderately dilated, and equally so on both sides; the right commissure of the lips slightly drawn upwards; the left upper extremity, on being raised, falls again by its own weight as an inert mass; no pain evinced on pinching it. The skin of the left lower extremity equally deprived of sensibility, and it seems deprived of all power of mo-

tion. On the right, however, the extremities are capable of performing some movements; when the right arm is raised, it is retained in the air by the patient, and does not fall again instantly as the left. Intellect entirely gone; the patient resembles a person in a profound sleep; we cannot see his tongue. The pulse lost the frequency it had the preceding days. (Bleeding to sixteen ounces—blisters to the legs — purgative enema.) During the day, the patient gave some signs of consciousness, and spoke a little. On the following morning there was a visible improvement — he answered questions with precision — lips and tongue in the natural state — he was also able to perform some motion with the extremities of the left side; but these limbs were evidently weaker than those of the right side; their sensibility was also less; pulse had resumed some frequency. Towards noon all consciousness was again lost; face very much injected, and up to the following morning he remained in a state of coma, from which nothing could arouse him. At our visit at eight o'clock, we found him absolutely in the same state as on the preceding evening; respiration stertorous; he died at noon.

Post-mortem, nineteen hours after death.

Cranium. — The meninges very much injected; sinuses of the dura mater full of blood. Through the entire extent of the cerebral hemispheres, every slice of the nervous pulp presented a very remarkable number of red points. In some places these red points, which are the orifices of so many vessels with blood, are so densely collected, that there result from them bright red spots, a franc piece in diameter.

Thorax. —Close adhesions of the left pleura above and behind; the bronchi considerably dilated; the summit of the left lung is of a black colour, and there is also an induration of several lobules. In the midst of these lobules, which were become impermeable to air, were found several small bony concretions, all nearly the size of a grain of barley. These concretions are as hard as real bone: several of them were ramified. Besides them were found other concretions of softer consistence, like lime on which a little water was thrown. Close adhesions of the pleura towards the summit of the right lung; in this summit were discovered cavities communicating with one another, which might at first be taken for caverns, but which a closer examination showed to be bronchi very much dilated. Around them were several lobules, black and hard; liquid black blood filled the right cavities of the heart; the left ventricle empty; a black clot, of some consistence, distended the left auricle; a little ossification at the base of the aortic valves. Some small bony patches scattered over the aorta.

Abdomen. — Limpid serum in the peritoneum; on the inner surface of the stomach, towards its small curvature, was an ulcer about the breadth of a five-franc piece, at least, with everted edges. The tissue constituting its bottom and edges possessed all the characters of encephaloid matter. The liver very voluminous; about two-thirds of it were changed into encephaloid substance: we observed,

there also, first a great development of the circumvolutions of the yellow substance; in several points, a bright red colour seeming to depend on an unnatural development of the vascular tissue; secondly, in other parts was found mixed with the tissue of the liver a pale greenish substance, possessing all the characters of fibrin which had lost a considerable part of its colouring matter, such as is often found in the cavities of the heart: thirdly, on removing still more of its colouring matter, this substance appeared changed into encephaloid matter; spleen very dense and hard. Between the spleen and kidney was found an encephaloid mass of the size of a pullet's egg; two other smaller masses, the size of a nut, were attached to the great epiploon.

Remarks. — This case resembles the preceding in the rapid manner in which the symptoms came on, as well as in the nature of the latter; here again is a group of symptoms similar in every respect to those characterising an attack of apoplexy; and on opening the body we find not a trace of hemorrhage in the brain, but only a very remarkable injection of its vessels. This injection, which gave an almost uniform red tint to some parts of the brain, was equal in both hemispheres; and yet motion was abolished in only one side of the body, precisely as in cases where one of the hemispheres has become the seat of effusion of blood. Another instance of the inadequacy of our present means of investigation to explain the infinite variety of the symptoms by anatomical lesions. And, observe, we cannot here even call the play of sympathies to our aid; for certainly the hemiplegia did not depend on them. The latter symptom disappeared twenty-four hours after it occurred; then it returned, and this circumstance might have inclined one to think that the cause which produced it was not itself connected with any serious lesion of the brain: the intellect also was restored for a time; but that is also observed in cases of cerebral hemorrhage. The hemoptysis, which appeared in early life, and never returned, as also the bony concretions in one of the lungs, the dilatation of the bronchi of the other lung, and the morbid structures seated in several of the abdominal viscera, render this a very remarkable case.

Case 3.—Signs of cerebral congestion existing for several years—On a sudden hemiplegia of the right side not preceded by loss of consciousness, subsequently sudden abolition of intellect, coma, and death.

A woman, about fifty years of age, entered the *Hôpital Cochin* with an ascites of several months' standing. She stated that for ten years she had scarcely passed a week without being affected with dizziness so great as to oblige her to seek support to prevent her from falling. These dizzinesses used to last for some minutes; they were accompanied with *tinnitus aurium*, and often when they ceased, the patient used to feel a pricking sensation at the ends of the fingers, which were occasionally as if benumbed. *There are some days*, she says, *when the objects which I touch are separated from my hand by a piece of velvet.* However, she never lost consciousness;

intellect clear and memory good. She expressed a great wish to be tapped, and I yielded to her request. After the fluid was removed, I discovered in the right hypochondrium a large tumour which extended to the navel, which at this part terminates in a blunt edge, and resembles in every way an enlarged liver. This tumour is found in the epigastrium; it disappears towards the left hypochondrium. Three days after the tapping the patient became weak, her tongue became a little dry, when, after another attack of dizziness without loss of consciousness, she felt, as often before, a numbness of both hands, but principally of the right; this numbness continued longer than usual. She fell asleep about eleven at night; on awaking she could not move the extremities of the right side. The following day, complete hemiplegia of the right side; the sensibility of the paralysed limbs still perfect; intellect good. The two days following, the hemiplegia continued. On the third day after the hemiplegia appeared, speech altogether suspended; she can no longer give any sign of intellect; the four extremities when raised fell as inert masses; eyelids closed; and when we raised them, the globes of the eyes remained immoveable. Coma then came on, and in two hours after the respiration became stertorous, and she died.

Post-mortem. — *Cranium.* — Vessels of the cerebral membranes gorged with blood; remarkable rose-coloured tint of the grey substance of the circumvolutions; unusual injection of the medullary substance of the cerebral hemispheres, equally marked on both sides.

Thorax. — Great congestion of the lungs; heart sound.

Abdomen. — Occupied by an enormous tumour, which conceals all the other viscera. This was an encysted dropsy of the right ovary; it consisted of two parts; the upper part solid, which, by reason of its situation, form, and relation, had been looked on as a tumour of the liver; the lower one was softer, and gave on pressure a manifest sensation of fluctuation. Internally it consisted of a great number of cells, which contained various sorts of fluid.

Remarks. — Here is another form of cerebral phenomena; and on examination the same state of the nervous centres; sanguineous congestion, and nothing more. In this case, the patient had been for several years threatened with apoplexy; then at the end of one of those giddinesses to which she was subject, she was struck with hemiplegia, and soon after died amidst total suspension of the functions of the life of relation. There is this notable difference between the present case and that which precedes it: it is, that in one the loss of consciousness coincided with the hemiplegia; whilst in the case now before us, the paralysis preceded the loss of consciousness. Thus all the combinations of symptoms produced by cerebral hemorrhage may co-exist with a simple sanguineous congestion of the encephalon. In the following case we shall see other symptoms appear, which are no longer those of simple hemorrhage, and are ordinarily regarded as more particularly connected with softening of the brain.

Case 4.—Pulmonary phthisis—Sudden loss of consciousness with permanent flexion of the left upper extremity—Death twenty-seven hours after the appearance of these symptoms—No other lesion in the nervous centres, except a bright red injection of their substance.

A man, thirty-six years of age, entered the hospital *La Pitié* with all the signs of phthisis already far advanced; for some days he complained of a rather acute pain towards the right temple, and a slight numbness of the extremities of the left side; then on leaving his bed one morning he fell suddenly, deprived of consciousness. When carried to bed he did not come to himself, and the following morning we found him in the following state:—Face very much injected; his attitude that of a person asleep; answers no questions, and appears quite a stranger to every thing passing around him. The left commissure of the lips slightly drawn up. The tongue cannot be seen; the fingers of the left hand strongly flexed on the palm of the same hand, and cannot be extended. The left forearm is also flexed on the arm, so as to form with it a very acute angle; the right upper extremity when raised falls again as an inert mass, as do also the two lower extremities; pulse small, not frequent; respiration embarrassed. Two hours after we left the patient, the two upper extremities were agitated by convulsive movements which did not last, and in the afternoon he died.

Post-mortem. — *Cranium.* — The substance of the two cerebral hemispheres was very much dotted with numerous red points.

Thorax. — Tubercular excavations in the two lungs; heart firm, with slight hypertrophy of the parietes of the left ventricle; black liquid blood in its cavities.

Abdomen. — Greyish tint on the inner surface of the stomach; numerous tubercles in the small intestine; liver and kidneys gorged with blood.

Remarks. — The symptoms here were similar to those which so often announce softening of the brain, and yet there was no trace of such a lesion; and, notwithstanding the difference in the phenomena on both sides of the body, a sanguineous congestion, equal on both sides, was all that was discovered. Why was there flexion of the limbs in this case, and not in the preceding cases? Anatomy does not inform us. Is it not a circumstance worthy of remark, that the four cases of cerebral congestion now reported were of individuals labouring under previous chronic affections? In three of them hematosis was for a long time vitiated; they were meagre, bloodless, and appeared to be in a condition entirely opposite to that which is usually laid down as favouring cerebral congestions. An additional example to prove that the facility with which local hyperemias are produced, is not always in the direct ratio of the plethoric state of the subject. The following will confirm this assertion still more, since it will be in another phthisical patient, that we shall see cerebral congestion to supervene, but with quite other symptoms.

CASE 5.—Febrile delirium followed by coma, which came on during the progress of a pulmonary phthisis—The cerebral hemispheres marked with bright red points.

A boy, eighteen years of age, entered the *Maison de Santé*, 16th July, 1830, in a complete state of delirium. We ascertained, from those who brought him, that having been ill a long time, and having had several times abundant hæmoptysis, he had been seized, without any known cause, on the night of the 14th July, with a violent headache, which was taken to be a mere megrim. This pain of head continued all the night, and the following morning it was complicated with vertigo and *tinnitus aurium*. He was desirous to get up, but he soon lay down again in consequence of the dizziness he felt when he stood up. All the day he continued to complain very much of his headache. In the evening delirium commenced. He was brought to the *Maison de Santé* on the 16th, in the morning, when his state was as follows: — Face red: eyes injected, and in continual motion; foam at the mouth; delirium complete; extraordinary loquacity; constant moving of the limbs; tongue whitish, moist, a little red at the apex; abdomen soft; stools passed involuntarily; pulse very frequent; skin hot and moist (bleeding to sixteen ounces; mustard cataplasms to the legs.) During the night he uttered loud cries. On the 17th the delirium still continued. He was bled again to the same amount as before. When the blood ceased to flow, convulsions of the limbs came on, which stopped after a few minutes. On the 18th, profuse coma; can neither see nor hear; the four extremities in a state of complete relaxation; conjunctivæ very red; pulse very frequent (twenty leeches were applied to the neck). In the evening he suddenly emerges from coma, utters loud screams, and it became necessary to restrain him by force in bed. The coma returned towards midnight. On the morning of the 19th, we found the features quite altered; prostration of strength greater; pulse more frequent (sinapisms to the lower extremities). He died the following night.

Post-mortem. — *Cranium.* — Vessels of the meninges very much injected; the circumvolutions marked with a rose-coloured tint; the medullary substance of the hemispheres very much dotted with red points; a few drops of limpid serum in the ventricles.

Thorax. — Tubercles in every stage in the two lungs; an immense cavity in the summit of each of them.

Abdomen. — An extent of the gastric mucous membrane equal to about a five franc piece, near the pylorus, marked with red points; some tubercles in the small intestine; general paleness of its mucous membranes, except about six inches above the cæcum, where it is injected. This injection was also found in the cæcum, and in the ascending colon, and in its sigmoid flexure.

Remarks. — This case presents symptoms altogether different from those which the four cases preceding it presented. They are similar to the symptoms of acute meningitis, or to those produced, by certain gastro-enteritis, which react on the nervous centres. Was the congestion, then, of which the traces were discovered in

the brain, the real cause of the nervous symptoms? If not, where is the cause? Is it to be referred to the bright red injection presented by the termination of the ileum, and a part of the large intestine? But how often have we not found a similar injection, without anything analogous in the symptoms? If we admit that the entire disease may be explained by the state of the organs after death, we shall refer the entire matter here to the cerebral congestion, either primitive or consecutive to the intestinal injection, which we shall call entero-colitis; and if we be asked, why, of five cases, where the cerebral lesion is the same, there are not two resembling each other in the symptoms, we shall not be able to solve this objection otherwise than by admitting in each what has been conventionally styled idiosyncrasy. There remains another mode of interpreting the facts: it consists in admitting, that this sanguineous congestion, which is produced in all our cases with functional disturbances so varied, is itself but an effect, and that it is not given us, with our present means of investigation, to ascertain the cause which produces this congestion, at the same time that it creates those different groups of symptoms which we traced in each of the five preceding cases.

RECAPITULATION.

The cases which have been just now reported, have shown the principal forms symptomatic of hyperemia of the cerebral hemispheres. On combining with those few cases which ended in death, several others of the same kind which terminated favourably, we have been led to the inference, that cerebral congestion may present itself to us in one of the eight following forms: —

The first form is characterised principally by dizziness of greater or less intensity: the patients may be affected at the same time with pain of the head, dizziness, *tinnitus aurium*, momentary aberrations of vision, temporary embarrassment in speech, a sense of formication in the limbs, and sometimes at the face. The countenance is generally flushed, eyes injected, pulse in general not frequent, and of variable strength. This state may last but for some moments, or some hours; but it may also be prolonged for several months, nay, continue even for several years. In some persons it shows itself but once; in others it reappears at intervals more or less remote. We have seen a man fifty-nine years of age, who, for the last thirty years, had not passed a single day without having in different degrees one or other of the symptoms mentioned in the preceding paragraph. Another person had experienced them from the age of thirty years till he was thirty-four. He then became completely freed from it till the age of forty-eight, at which time he was again attacked with violent dizziness. We noticed the case of several persons in whom every year, nearly in the same month,

these attacks of dizziness reappeared. In some females they manifest themselves regularly at the return of each menstrual period.

After this dizziness has lasted a shorter or longer time, it may happen that they attain all at once such an intensity as to be changed into a sudden loss of consciousness; but the latter may likewise supervene without having been preceded by dizziness. It is this sudden loss of consciousness, with or without preceding dizziness, which characterises the second form of cerebral congestion. In this form the patients fall to the ground, deprived suddenly of all understanding, sensation, and motion; but if their limbs be raised, they do not fall back again by their own weight, and some patients can sustain them in the air. There is not then, properly speaking, any paralysis. They may remain in this state from some minutes up to twenty-four or thirty hours: then they come to themselves, and are quickly restored, without any lesion either of sensation or motion remaining. Others, after having come to themselves, retain for some days a little difficulty in the performance of some of the functions of the life of relation. Thus their speech is embarrassed, or their different movements are difficult.

At the same time that the patients fall deprived of consciousness, they may be struck with paralysis, either general, or confined to only one side of the body. This is the third form of cerebral congestion. But almost at the same time that the loss of consciousness disappears, the paralysis is also seen to disappear, so that cerebral hemorrhage cannot be admitted to have taken place in this case. The cases we have cited prove the possibility of this paralysis, without any effusion of blood having taken place into the brain. Instead of general or partial suspension of motion, this function may be performed in a manner disorderly and irregular, and without any participation of the will. Then at the same time that there is loss of consciousness, there are observed, either different convulsive movements, or permanent contraction of a certain number of muscles; all these symptoms last at the utmost for some hours, they then disappear, without leaving any trace behind. This constitutes the fourth form of cerebral congestion. In a fifth form, there is no longer loss of consciousness; it is paralysis that comes, on at the very first, sometimes limited to certain muscles of the face sometimes extended to the entire of one side of the body. This paralysis disappears very promptly, oftentimes a few hours after having commenced; and from this circumstance it is not to be presumed that it is connected with a hemorrhage, or softening. Our fourth case actually proves the contrary. The course of this paralysis was very remarkable in the following case. A middle-aged man working in the quarries near Paris, was suddenly seized, on finishing his dinner, with a numbness of the right hand; an hour after the entire upper extremity was totally deprived of motion; no pain is felt in it: nor does he complain of his head. At five o'clock in the evening, he had a sense of formication in the right foot: soon the power of motion was equally lost in the lower

extremity of the right side: he entered the hospital *Cochin*. On the following morning the hemiplegia of the right side was complete; the sensibility of the paralysed limbs was still retained; he cannot move the right cheek, and when he speaks, the left commissure of the lips is drawn up; the direction of the tongue is straight, intellect perfect; he feels a numbness (this is his own expression) towards the frontal region; he was bled to sixteen ounces. In the course of the day he was able to make some slight motion with the extremities of the right side. On the following morning there was no trace of paralysis. This certainly is not the way in which the effects of cerebral hemorrhage disappear, or of any lesion affecting the interior of the nervous mass.

The sixth form of cerebral congestion is characterised by the sudden appearance of convulsive movements, partial or general, without preceding loss of consciousness. These movements promptly disappear, without leaving any trace behind them. They may also come on, after the persons have experienced attacks of giddiness for a shorter or longer time, and the latter may even survive them. In a seventh form, the cerebral congestion no longer produces coma; it no longer exercises any perceptible influence on the movements; the intellect is the function here especially disturbed; violent delirium is observed, accompanied with great development of muscular strength; most frequently, some time before death, the delirium is replaced by a state of coma, which becomes more and more profound. However, we have ourselves seen cases in which, up to the moment of death, the patients retained great agitation of the limbs, and ceased not to speak and vociferate. The most remarkable case of this kind which we met was that of a middle-aged man, who for several hours uttered incessantly cries so loud as to disturb the rest of the entire ward. Suddenly he was no longer heard; when we approached his bed he was dead. A thunderbolt could not have struck him more promptly.

On opening the body no other lesion was detected except considerable injection of the nervous mass. We shall now notice the eighth form of cerebral congestion, of which our fifth case presents us an example. In this form we see continued fever appear at the commencement, during which those symptoms principally predominate, which appertain to the first form of cerebral congestion already described. We particularly observed this form in some young soldiers, who were admitted in considerable numbers into our wards at La Pitié, in the beginning of the summer 1831. After laborious exercise, several of these soldiers were seized with violent pains of head, vertigo, ringing of the ears; some even fell suddenly deprived of consciousness, and on coming to themselves they remained with the symptoms above detailed. On entering our wards, a little time after the attack of their malady, they presented to us the following state: — Face red; eyes injected and moistened with tears; ringing of the ears, vertigo; great dizziness, which prevented them from standing erect without being threatened with

falling; frequent epistaxis; general debility; continual tendency to sleep; pulse strong and frequent; skin hot; no appreciable alteration with respect to the digestive or respiratory organs. This group of symptoms lasted from between three to twelve days; almost all of them were bled; some were merely subjected to the use of diluent drinks. By degrees the fever lessened, according as the symptoms of cerebral congestion disappeared. No doubt it was not demonstrated that all the diseases in these cases was in the brain; perhaps there existed only mere general over-excitement, in which this organ participated. But the prevailing symptoms were always those of cerebral congestion, and, on the removal of the fever, these were the only symptoms observed, and the only therapeutic indication was to combat them. None of these cases terminated fatally: in one patient only there was momentary delirium; in others the attacks of dizziness were for some days so violent, that we dreaded lest they should terminate in apoplexy.

Let us now consider the causes under the influence of which cerebral congestions more particularly develop themselves. We shall first see what influence the different degrees of atmospheric temperature possess over cerebral hyperemia; and first, with respect to the influence of an elevated temperature: this is represented by the portion of the thermometric scale included between *20°c. and †50°c. above Zero. For, at a higher temperature than that of 50°, man can no longer prolong existence beyond a few minutes. From 50° to ‡40°c. man resists or dies rapidly with all the signs of cerebral congestion. From 40° to §35° the same phenomena are still observed. We have had an opportunity of examining the bodies of some who died under the influence of this temperature: there was found in them sometimes simple cerebral congestion, sometimes effusions of blood into the substance of the brain. Among the cases of this sort which he might cite, we found few as interesting as the following:‖

Three labourers, occupied in three different places in getting in the harvest during days when Reaumur's thermometer marked ¶40° in the sun, died suddenly. The circumstances accompanying these three deaths could be ascertained only in two of them, for the third was found dead. According to the eye-witnesses, the two former could not have left their work more than five minutes before their death. They turned round, putting their hands forward, as if they had been deprived of sight, and must have expired at the moment when they appeared merely to wish to sit down. The individual who died first, that is, on the 6th of July, was a man of mature age, but putrefaction made such rapid progress, that it was impossible to keep his body till the proper time for examining it.

The second died on the following day. It was a woman, twenty-one years of age. Her body was examined. Muscles well deve-

* 68° Fahrenheit. † 122° Fahrn. ‡ 104° Fahrn. § 95° Fahrn.
‖ Bibliothèque Médicale, tome 70, p. 250. ¶ 122° Fahrn.

loped; all the articulations were completely rigid; on the back and face were livid spots, and already the odour of putrefaction began to manifest itself; abdomen tympanitic, smooth, and free from spots. On examining the cranium, the hairy scalp was found thick, and well furnished with hair; the bony case, on the contrary, was extremely thin, but sufficiently furnished with diploë; the dura mater was natural in every part, and no effusion was observed between it and the bones of the cranium, nor was any found over or under the pia mater, but the veins and arteries of these two membranes were gorged with blood. The brain presented no irregularity, only its substance was very soft: the ventricles contained a little more serum than natural; the lungs had contracted adhesions with the pleura costalis, but these adhesions were constituted only of a sort of filaments rather than membranes; no sign of inflammation of the lungs or pleura, nor any effusion; the lungs were very large, filled with air; the pulmonary vessels were gorged with blood, and the bronchi filled with frothy mucus: the pericardium adhered to the heart just as the lungs did to the pleura costalis, by filaments, and contained a considerable quantity of serum; size of the heart natural; right ventricle a little distended, filled with liquid black blood; the left ventricle was contracted and empty. On opening the abdomen, an infectious odour was diffused; the intestines were filled with gas, their convolutions, lodged in the pelvis, presented some red spots; the portion of intestine in the vicinity of the gall-bladder had a deep tinge of yellow; the gall-bladder contained but a small quantity of natural bile; all the other viscera were sound, with the exception of the organs of generation; the fundus of the uterus was intensely red; the right ovary had contracted adhesions to the Fallopian tube and the peritoneum; its vesicles were filled with black coagulated blood; the cavity of the uterus contained a little liquid blood; this was removed with a sponge, but merely compressing the parietes of the womb caused a new quantity to reappear through an immense number of vascular orifices; besides, there was obtained, on pressing the neck and orifice of the uterus, a fatty yellowish substance, every way like to the coat with which the vagina and labia majora were covered. The diameters of the uterine cavity were much larger than natural, and the uterus itself, far from being flattened, had the form of a pear. In the cavity of the pelvis there was found an effusion of about two ounces of blood.

The third person died suddenly on the 8th July. This was a stranger, a woman between forty-eight and fifty years old. We proceeded the following day, in the morning, to examine her body. She was of the middle size, rather fat than otherwise. All the articulations were rigid; the back was traversed by blue spots; almost the entire face was covered with them; the face from the chin to the nose, was absolutely livid; several also were to be seen on the chest, the size of which varied from that of a lentil to that of a twenty sous piece. These spots had precisely the appearance of

petechiæ, and yielded, when cut into, some liquid blood. The body was still warm, but already it exhaled a fetid odour; the abdomen was tympanitic; the integuments, and bones of the cranium, presented nothing extraordinary; their vessels, as well as those of the brain, contained some liquid blood; the cerebral substance was extraordinarily softened; the lateral ventricles contained a bloody serum; the cartilages of the ribs were ossified; the right lung adhered intimately to the pleura costalis; the left side was quite free. The pericardium presented a slightly inflammatory tint on its inner surface; the right ventricle of the heart contained a little black liquid blood; the blood of the left ventricle was red and frothy; the abdominal cavity contained a pint of serous effusion, the odour of which was putrid; the intestinal canal was very much distended with gases, and the parts of it near the gall-bladder had a yellow tinge; the latter was empty.

According as the temperature is lowered, though it should be still considered very much elevated, the phenomena just now mentioned become more rare; they are still observed from 35° to 30°c.; but below the latter degree, from 30° to 20°c. (the temperature of our warm seasons), the tendency to cerebral congestions disappears; and at the latter limit, the frequency of the hyperemia of the nervous centres ceases to be in the direct ratio of the elevation of the temperature. Far from that, observation proves that in the cold seasons of our temperate Europe, the frequency of cerebral congestions increase. Thus, in Holland, it has been ascertained that, during a period of twenty years, winter was the season when these congestions were most numerous; after winter, autumn furnished most cases; then spring, then summer.* In a climate very different from that of Holland, at Turin, an average of twenty-five years showed the range of the seasons to be in the following order with respect to the frequency of cerebral congestions: winter, spring, summer, autumn.†

In Paris, the statistical researches of M. Falret led him to conclude that congestions and hemorrhages of the brain are more frequent in winter than in summer and spring. In 114 cases, which fell under our own observation, in which we noted the month of the year in which the cerebral congestion took place, the following is the result:—

For the months of December, January, and February,	50 Cases.
June, July, and August,	36
March, April, and May,	21
September, October, and November,	17

Very low temperature, as that for example to which our army was subjected at the time of the retreat from Moscow, favour the development of cerebral congestions, as well as a very high temperature.

M. Larrey informs us that most of the persons who died in that

* Annales d'Hygiène Publique et de Medecine Légale, ii. 234.
† Idem.

retreat were at first affected with dizziness and vertigo; they then fell into a state of somnolence, which was soon succeeded by profound coma, and finally by death.* The sudden transition from one extreme of temperature to another should also be set down among the number of atmospheric influences, which have produced cerebral congestions in more cases than one. In a word, these congestions find at least an occasional cause of development in the two extremes of temperature, and they are reduced to their minimum of frequency by the influence of a mild and uniform temperature. There are also times, when, all at once, without any known cause, cerebral hyperemias, with or without effusion of blood, are found to occur in considerable numbers.

Baglivi, in 1694, and Lancisi, in 1705, saw apoplexy suddenly become so common in certain parts of Italy, that they have described it as having been in those years really epidemic. Among those attacked with it, some presented the different signs characterising simple cerebral congestion; the others, and those in great number, had still more: for after the attack they continued hemiplegic, which would make one suppose that they had had cerebral hemorrhage. Baglivi remarks that this epidemic apoplexy, which struck terror into the population, was preceded by unusual atmospheric circumstances: to a broiling hot summer had succeeded a winter so severe, for the country about Rome, that all the fields were covered with snow, and this severe winter was followed by a summer still hotter than the preceding, during which, for the space of five months, there fell not one drop of rain; then the following winter was remarkable for constant rains.

We know nothing positive regarding the influence which the greater or less quantity of electricity, with which the atmosphere is charged, may exercise on the production of cerebral congestions. Here, however, is a fact which may be adduced to show, that electricity, employed as a therapeutic agent, may at least favour the development of these congestions. A man, after having been for a long time subject to frequent attacks of dizziness, induced by cerebral congestions, and which disappeared under the influence of bloodletting and purgation, had an attack of apoplexy with hemiplegia, loss of speech, grinding of the teeth, respiration irregular, sometimes slow, and sometimes frequent; pulse intermittent, and sometimes scarcely perceptible, without, however, any sign of gastro-intestinal irritation; repeated bloodletting and revulsive purgatives soon restored him to a tolerable state. At the end of some months every brain symptom disappeared; pulse more regular; the use of speech had nearly returned, as also some degree of motion in the affected limbs, when Dr. Strambio wished to try electro-puncture in order to restore innervation to the half-paralysed side. Dr. Fantonelli performed the operation in the following manner: he introduced a needle into the lower part of the neck,

* Campagnes, tome iv. p. 127.

on the side opposite the paralysed limbs, then another needle into the external malleolus of the affected leg; a metallic wire, communicating with the two needles, was brought in contact with a voltaic pile of five discs only, so that the negative pole corresponded with the needle of the affected part: the introduction of the needles was not painful; but at each stroke of the pole, strong pains and violent contractions were manifested in the muscles nearest to the needles, and principally in those of the part affected. After five or six electric shocks, it became necessary to desist, the pain becoming intolerable: the electro-puncture was repeated three times after one day's interval. After the first experiment, the patient was more cheerful, and performed the several movements with more freedom; at the second, he experienced some uneasiness; and at the third, he was attacked with violent fever, with all the appearances of a cerebral congestion. Bleeding and revulsives soon quieted these symptoms; but his former state returned. At present, his speech is nearly gone, and the movements of his leg are very weak. Arnica and rhus radicans were tried, but to no purpose, nay, rather with disadvantage. More positive researches than any yet made, are necessary to establish, how far a diet usually strong and exciting directly influences the production of cerebral congestion. In order that it should do so, we think that there must be at least a disposition on the part of the individual. Alcoholic liquors will beyond all doubt produce cerebral congestion. Nothing resembles some of the forms of cerebral congestion described by us more than intoxication. We have had twice an opportunity of opening the bodies of persons, who, after indulging in strong liquors to excess, fell down drunk and dead* (*ivres morts*), according to an expression consecrated by use. What we found was as follows: In both the pia mater covering the convexity of the cerebral hemispheres was very much injected; the grey substance of the circumvolutions participated in this injection; the entire substance of the hemispheres was traversed by a great number of red points; the ventricles contained a moderate quantity of serum, the cerebellum was also injected, as well as its membranes, but not more than the brain. In no part was the consistence of the nervous mass altered. We found neither in the ventricles, nor elsewhere, any odour of alcohol, as was discovered within these ventricles in an individual whose case is given in Dr. Cooke's work on Nervous Diseases. In this latter case, the body was opened immediately after death; there was found in the ventricles a clear fluid, which had the taste and smell of alcohol, and which took fire on being brought near a burning body. In one of the cases we examined, the mucous membrane of the stomach presented, in several parts, near amounting to one third of the stomach, a surface dotted with bright red points; in

* The expression which use has consecrated among us, namely, *dead drunk*, is used to signify not precisely the same thing as is here meant by *ivres morts*. —Tr.

the other, the gastric mucous membrane was of a white colour; it was not softened in either case.

Alcoholic liquors have not only caused cerebral congestions; they have also sometimes produced hemorrhage either around the brain into the sub-arachnoid cellular tissue, or into the nervous substance itself. These facts prove beyond a doubt, that alcoholic liquors produce drunkenness by acting directly on the brain, and not through the intervention of the stomach. Here is what was observed regarding the symptoms in one of the above mentioned cases (the second). A man was brought to *La Charité* about an hour after having drunk an enormous quantity of brandy and other alcoholic liquors. For the last half hour he had been in a state of the most profound coma; skin seemed insensible; respiration stertorous; pupils exceedingly dilated; pulse frequent and full. This state lasted without any change for twenty-four hours; it then ceased, and was suddenly replaced by furious delirium; the latter lasted about fifteen hours; at the end of this time the coma returned, the respiration become more and more embarrassed, and the patient died. We have already seen the lesions found on the dead body. Active treatment was employed; he was twice bled; thirty leeches were applied to the neck; his head was covered with ice, and his lower extremities were enveloped with sinapisms. This group of symptoms, as well as the *post-mortem* examination, sufficiently prove the direct influence exercised on the brain by alcoholic preparations.

A great number of substances, ranked as narcotic poisons, have commonly the effect of determining in the brain a greater or less congestion. But, certainly, it is not by this congestion alone, that the special phenomena produced by each of them can be explained. Let a man have been poisoned by alcohol, by opium, belladonna, tobacco, digitalis, camphor, prussic acid, &c., there will always be found in the brain, when examined after death, one and the same modification, which will vary only in intensity; this will always be a hyperemia: and yet, what can be more dissimilar than the functional disturbances to which the use of these substances shall give rise? Beyond the hyperemia, the only phenomenon which appears to us after death, there are then, in the brain, other modifications produced, which are no longer proved by the scalpel, but by the diversity in the nature of the symptoms observed during life. It is not then the cerebral congestion which is the cause of the specific symptoms which are produced by the different substances just named; this congestion is but one of the elements of the morbid state to which they give rise; a secondary element, the intensity of which does not increase with the severity of the symptoms, and which may even be wanting, without the latter ceasing to exist. Is it true that the specific symptoms produced by each of them, may be explained by the influence which each of them exercises over a particular part of the encephalon? Is it true, for instance, that opium acts especially on the cerebral hemispheres, alcohol on the

cerebellum, belladonna on the tubercula quadrigemina? This is not the place to discuss the value of the physiological experiments, by the aid of which an endeavour has been made to establish their specific actions. All that we should say is, that hitherto, the observations made on man have not sufficiently demonstrated these results, neither have they disproved or invalidated them. However, we shall remark, that in those two cases of poisoning by alcohol which we have mentioned above, the congestion was seated in the cerebral hemispheres, as well as in the cerebellum, and that the latter was not the seat of any specific lesion, at least of one which our present means of investigation will permit us to recognise. Besides, nothing is more variable, as every body knows, than the influence exercised on the encephalon by the different substances whose action we here examine. There are, in this respect, individual susceptibilities, instances of which have fallen under the observation of every medical man.

After having considered some of the external circumstances, which, by the effects they produce on the organs generally, may favour the development of cerebral hyperemia, let us now direct our attention to these organs, and endeavour to ascertain whether they will not present certain conditions, which may also have their share in the production of encephalic congestions. Among these conditions we find some states of the brain itself. Thus, forced exertion of the intellect is an unquestionable cause of cerebral congestion. We knew a young man, twenty-seven years of age, who, after having devoted himself, for a month unceasingly, to very painful mental exertion, fell down suddenly, deprived of consciousness and motion; he was considered as struck with a severe attack of apoplexy; he was immediately bled; at the end of an hour he recovered the use of his senses; he was not paralysed, but the limbs on both sides were in a measure benumbed; he stammered; recovered but with difficulty the thread of his ideas, and he stared at those around him with an astonished, and, as it were, stupid air; these phenomena lasted forty-eight hours, continually diminishing; then they disappeared. There remained, however, a certain vagueness in his ideas, which did not leave him till he remained for some time in the country. Strong mental emotions have, more than once, produced cerebral congestions, some of which have ended fatally.* Certain diseases

* The following observations of Dr. Bright, illustrative of the effects of *cerebral pressure from vascular turgescence*, will not be deemed inappropriate in this place.

The symptoms induced by this state, when it comes on suddenly, are vertigo, loss of consciousness, loss of voluntary power, and not unfrequently convulsions; and hence the difficulty of drawing a correct diagnosis between apoplexy from congestion, and certain epileptic attacks. There is, in truth, scarcely any precise distinction to be recognised; the same state of the vessels apparently inducing both, and the one pressing imperceptibly into the other. The convulsive nature of the symptoms marks the chief difference, and this probably depends, rather upon some original irritability of the brain, or on the part which chiefly suffers from congestion, than on any difference in the exciting cause. When cerebral

of the brain have also the effect of producing in this organ a congestion, which has been erroneously taken for the very cause of the disease; this is the case with epilepsy; but though not causing the attack itself, the congestion which accompanies or succeeds it, becomes itself, in its turn, the cause of certain symptoms. It is on this that the cerebral phenomena seem to depend, after the fit has terminated; such as certain disturbance of the intellect, or else a state of coma which lasts for a shorter or longer time, or again, certain disturbances of motion, as paralysis, or a momentary contraction. The congestion which takes place in the brain of epileptic patients, during the fit, leaves also traces on the face. Thus, several epileptic persons present, for two or three days after each fit, slight marks of ecchymosis in the skin of the cheeks, and on the conjunctiva. We have seen one in whom, at the end of each attack, a broad livid mark, similar to that produced by a contusion, covered the forehead and eyelids; this mark diminished gradually, and there was no trace of it at the end of six or seven days.

Accidental products developed in the brain, old apoplectic cysts existing in this organ, must again be considered as so many thorns, which, from time to time, call around them, as around a centre of irritation, a hyperemia variable in intensity and extent. By the more or less frequent returns of this hyperemia are explained certain phenomena, intermitting as their cause, which appear at intervals in individuals labouring under a cerebral affection of long standing, phenomena most usually combated by bloodletting. In this way, in particular, may be explained those intermitting convulsions to which several children are subject, in whose brain tubercles exist. It often happens that, when once the convulsions have ceased, there no longer remains any cerebral symptom indicating the existence of the accidental product: a remarkable instance of this intermitting phenomena produced by a constant lesion. The influence exercised by the different organs, in health or disease, on the production or return of cerebral congestion, merits particular attention. There is no doubt, for example, that, in those who are predisposed, the process of digestion favours the return of these congestions; and to a slight degree of those congestions, we may attribute the drowsiness exhibited by certain persons after meals. With respect

congestion takes place more slowly, either as the effect of narcotic poison, or creeping on with the course of years, or as the result of habitual indulgence, or arising in the progress of disease, it is marked by increasing listlessness, by drowsiness, lethargy, and complete coma; while temporary numbness, or loss of sensation, or depraved sensation, is often experienced, and towards the close not unfrequently convulsion. The first of these forms often admits of being greatly and permanently relieved; and, though apt to return, may, by care, be warded off for a long period. The latter, that is the more slow and the chronic form, is less immediately under the control of medicine; but when it depends on the action of narcotics, will admit of being greatly relieved by treatment, allowing the effects of the poison to subside, and when it arises from any definite disease, its removal depends on the cure of the original disorder.—Bright, vol. ii., part 1, p. 198.

to diseases of the stomach, they possess in certain cases a manifest influence on the development of cerebral congestions. Thus, at all ages, and particularly in infancy, acute gastro-enteritis may be accompanied by symptoms announcing the existence of an encephalic hyperemia. The same happens, though more seldom, in chronic gastro-enterite.

The circulatory apparatus may again, by the different states in which it may happen to be, produce different degrees of cerebral congestion.* There can be no doubt that the variable degrees of

* M. Bricheteau, physician to the *Hôpital Necker*, has, within the last few weeks, published a volume entitled CLINIQUE MEDICALE *de l'Hôpital Necker*.—One of the essays contained in this work, treats of the influence of the heart and arterial circulation of the brain and its functions—on the connexion of hypertrophy of the left ventricle with different diseases of the brain: such as cerebral congestions, apoplexy, &c. We shall cite one or two of the cases contained in this essay:—

CASE 1.—*Symptoms of hypertrophy of the heart—Attack of apoplexy—Death—Sanguineous congestion in the vessels and sinuses of the brain—Hypertrophy of the left ventricle.*

Louis Germain, fifty-seven years of age, had been rickety in his infancy; conformation of his chest bad; neck short, head large, and countenance florid. For several years back he had been troubled with palpitations, for which he entered the infirmary of the *Hospice de Bicêtre*, in July, 1814. His pulse was then frequent, hard, and irregular; pulsations of the heart very extended, sensible to sight and touch; general bleedings were resorted to; leeches over the region of the heart, &c. The patient was relieved when, after a hearty meal one evening, he felt all at once a difficulty of respiration, with loss of consciousness. His mouth was filled with foam, countenance became purple coloured, and he died soon after.

Post-mortem.—Sinuses of the dura mater gorged with black and fluid blood; the substance of the brain very consistent, and the vessels of this viscus very much engorged; but there was no effusion of blood, neither into the cerebral tissue, nor into the ventricles. The left ventricle of the heart was rather large; the thickness of its walls more than doubled, and its capacity rather contracted than increased.

CASE 2.—*Attack of apoplexy—Death—Sanguineous engorgement of the brain and its vessels—Hypertrophy of the left ventricle.*

A servant at the *Hôtel Dieu*, fifty years of age, of an irritable temper, was for a long time troubled with domestic annoyances. His countenance, and particularly his lips, were of a violet-red colour; he was found one morning extended on the floor deprived of consciousness; face purple; eyes fixed, pupils dilated; respiration stertorous; pulse small and slow; skin cold and insensible; limbs in a state of complete relaxation, &c. The patient was removed into one of the wards, where he died in six hours, notwithstanding every attention was paid to him.

Post-mortem.—Vessels of the brain gorged with blood; cerebral substance very much injected; no sanguineous effusion discoverable; lungs a little gorged with blood; heart, which was of considerable size, presented a marked thickening in the walls of the left ventricle. The auriculo-ventricular septum was also very much thickened.

CASE 3.—*Symptoms of apoplexy—Death—Engorgement of the vessels and of the cerebral substance—Hypertrophy of the left ventricle.*

A man, forty-five years old, felt one day all the symptoms of an attack of apoplexy. He entered the *Hôtel Dieu* on the same day. Every symptom then

force with which the heart drives the blood towards the brain, may have an influence on the formation of encephalic hyperemia. As a proof of it, we have often seen persons, in whom the increase of violence in the palpitations, with which they were habitually attacked, was constantly accompanied with vertigo, dizziness, ringing in the ears; some experienced at the extremities of the fingers a sensation of numbness; these phenomena ceased from the time the palpitations became less violent. Others, who were not habitually subject to palpitations, were uniformly seized with violent beating of the heart, at the time when the signs of cerebral congestion appeared in them; one of these persons told me, that at the moment he began to perceive the beating of the heart, he felt these beatings repeated in the head. Increase in the force of the heart's impulse, whether entirely nervous, or owing to hypertrophy of this organ, has then a real influence in the production of cerebral congestions; the pre-

disappeared, with the exception of a little embarrassment in his speech, and a slight hemiplegia. Pulse frequent and hard; heart beat with considerable force. The next day the speech was more embarrassed; face pale and swollen; mouth frothy; respiration loud; action of the heart strong (bleeding from the foot, sinapisms, &c.). The next day all the symptoms became worse; complete hemiplegia, respiration stertorous; action of heart very strong, irregular; pulse small; death.

Post-mortem.—Cerebral substance firm and sound; vessels very much injected, allowing some drops of blood to escape when the organ is sliced; *pons Varolii* a little softened; heart large; walls of the left ventricle thicker than natural, whilst those of the right side are in some parts thinned.

M. Bricheteau, who appears from this work to be an irreconcileable foe to vitalism and its abettors, and seems determined that the doctrine of the influence of physical laws over vital actions shall once more take a prominent place in medical science, deduces from his cases, and his reflexions on them, the following six propositions:—

1. The energy with which the heart, more or less approximated to the head, propels the blood to the brain, in health as well as in disease, exercises an influence on the character, the extent of the cerebral functions, and even on the instinctive intellectual faculties.

2. Hypertrophy of the left ventricle of the heart may produce cerebral congestions, hemorrhage, attacks of apoplexy by the mere abnormal impulse which it communicates to the blood; and this consequence is far from rare.

3. The too violent impulse of the blood upon the brain may cause laceration of the cerebral pulp, dilatation and rupture of the vessels, at those points of the brain which receive most of them, the rupture being prompt and easy, when these vessels are attacked with aneurism.

4. The essential and indispensable condition for congestion of or effusion into the brain, as a consequence of hypertrophy of the heart, is the absence of every obstacle to the course of the blood, between the left ventricle and the encephalic mass; such would be, for instance, ossification of the sigmoid valves of the aorta, contraction of the origin of this artery, ossification of the small arteries, &c.

5. Another condition favouring and accelerating the impulse and congestion of blood towards the head, and which must hasten its consequences, is the contracted state of the hypertrophied ventricle. Dilatation produces a contrary effect by increasing the volume of the heart, and weakening its contractile power.

6. The knowledge of the influence of hypertrophy of the heart on the development of cerebral congestions and of apoplexies, is of direct advantage in the practice of medicine, in that it points out with certainty the means of preventing and combating these affections, and often preventing their return.

ceding facts scarcely admit a doubt of it. But we must guard ourselves against concluding, that all individuals who have palpitations, have, consequently, a cerebral congestion: we have interrogated on this matter several individuals attacked with organic disease of the heart, and several of them in answer stated, that even at the moment when they were tormented with violent palpitations, they had neither dizziness nor vertigo, nor any other sign of encephalic hyperemia. On the other hand, among the individuals in whom there exists a tendency to this hyperemia, there are several who never have had palpitations, and whose heart seems to be in no way diseased. In the five cases of cerebral congestion terminating in death, which we have recorded, there were but two in whom the heart was no longer in the natural state. The other cases of cerebral congestion, which have also terminated in death, and have been published by different authors, give nearly similar results. It has been stated that an obstacle to the course of the arterial blood below the arch of the aorta, must produce the same effect as hypertrophy of the left ventricle of the heart, and favour, in the same manner as this hypertrophy, the production of encephalic hyperemias. A case has even been published, in which an attack of apoplexy was considered referrible to a tumour, which compressed the aorta a little below its passage through the diaphragm. If such a cause were real, it certainly should have its maximum of influence in cases where the aorta, immediately below its arch, was considerably contracted, or even obliterated; now in the cases of this kind which have been cited, there is not a word either of congestion or cerebral hemorrhage.*

When any obstacle whatever is opposed to the free return of the blood from the brain to the heart, is the result of this a tendency to cerebral congestion? There can scarcely be a doubt of it, if it be only considered what a person feels in the brain whose neck is very much squeezed; besides, it has been remarked, that one of the effects

* In the enumeration of the causes of cerebral congestion, our author seems to have taken no notice of the different pathological states of the lungs, which have a tendency to bring about such a result. The following observations of Dr. Bright on the subject, will compensate for the omission:

"The conditions of the lungs most apt to produce (cerebral) congestion are: condensation from the presence of effused fluid; changes in the bronchial membrane from chronic inflammation. Extensive emphysema of the lungs, whether the consequence of original weakness in the structure of those organs, or from violent exertion, or from chronic *thickening of the bronchial tubes;* and sanguineous congestion generally dependent upon some obstruction to the free passage of blood through the *heart;* and occasionally the changes consequent on phthisis and pneumonia. Many of the most distressing symptoms of bronchitis — the intense headache, the wandering delirium, and the lethargic coma, are undoubtedly dependent on the state of the circulation through the head."—(See vol. 1, pp. 127 to 134.)

"It is, however, not quite evident what part the simple mechanical congestion and what part the chemical condition of blood takes in this morbid train of symptoms; there can be little doubt that both these causes exert a hurtful influence; for if any organ of the body is calculated to feel more injuriously than another the imperfect quality as well as the disproportionate quantity of the blood with which it is nourished, it is probably the brain."—(Dr. Bright, vol. ii. p. 221.)

of death by strangulation was the production of cerebral congestion. Recent researches have, moreover, shown, that the obliteration of some of the sinuses of the dura mater had, at least more than once, coincided with the formation of cerebral congestions and even hemorrhages. Is it also on cerebral hemorrhage that the extraordinary phenomena depended, which are mentioned in the following case, published by Dr. Gintrac, a distinguished physician of Bordeaux?* A child, four years old, was subject from its birth to an affection which consisted in a momentary suspension of voluntary motion. The attack appeared suddenly; if the child were standing up, the lower limbs became flexed, the trunk was reversed, and he fell. In bed the attack announced itself only by the complete relaxation into which the locomotive apparatus was thrown. During the attack the sensibility was diminished; the senses were a little dulled; the eyes remained open, and immoveable; the hearing was preserved; the intellectual faculties were retained: but the little patient was unable to articulate a syllable. This child died of pneumonia, which came on during measles. On opening the body, M. Gintrac found the superior longitudinal sinus converted into a hard cord, to which veins returned filled with coagulated blood. The parietes of this sinus were thick, dense, and of a yellowish colour; they resisted incision, and sounded under the scalpel; a solid clot filled this sinus. No other alteration was detected.

Another question may be here raised. Should the increase in the rapidity of the blood's course, such as is produced by fever, be ranked among the causes which may produce congestion of the brain? If, in this state of the system, several of the tissues are obviously reddened, may it not be supposed that the same thing will happen to the brain? What is certain is, that we cannot otherwise explain the pain of the head, vertigo, perverted vision, &c., which accompany every access of fever. In children, this morbid state is accompanied with somnolence; there are adults also who cannot have a fever, even of moderate severity, without becoming extraordinarily drowsy, or without having some delirium, which disappears as the fever declines. Observe again these pandiculations, the extreme sensibility to all external impressions, the fatigue, and dull pains in the limbs, the general debility, which accompany fever when it is well marked; are not all these the phenomena which accompany certain forms or certain degrees of cerebral congestion? The real existence of the latter cannot be questioned in such a case: but far from being the cause of the febrile disturbance, the congestion is often but an effect of it. The production of cerebral congestions is also favoured by the inflammation of the different organs. The hyperemia, which does not constitute inflammation, but which is one of its elements, may be repeated on the brain, and this is observed, both when this inflammation still continues in all its force, and when it has prematurely disappeared. As an example

* *Recueil d'Observations*, Bordeaux, 1830.

of the first case, we shall instance erysipelas of the face or of the scalp, which sometimes terminates fatally by the cerebral symptoms which are complicated with it, and for the explanation of which no other lesion is found, on examination, than a greater or less hyperemia of the encephalic mass. As an example of the second kind, we shall instance what occasionally happens during measles or scarlatina. In some children the eruption has scarcely shown itself, when it begins to fade, and at the same time the face and eyes become very much injected; the children complain of headache; they become debilitated; all motion is painful to them; they soon become comatose, and die. To account for these serious symptoms, what do we find in the encephalon? Sometimes a seropurulent infiltration of the meninges, or a perceptible distension of the ventricles by turbid or limpid serum; but most frequently nothing more than simple hyperemia, which, in more than one case, is itself not very well marked.

It is, again, common enough to see signs of cerebral congestion come on during the febrile disturbance which precedes the eruption of small-pox, measles, or scarlatina; in this fever several children are seized with convulsions, stupor, delirium, and these phenomena vanish as soon as the eruption appears. There are other cases where cerebral congestion recognises for its cause neither intense febrile disturbance nor an inflammation; but where it is connected with other congestions which occur in different organs, and which alternate one with another. Sometimes this tendency of several parts to hyperemia is connected with a general state of plethora; sometimes the latter does not exist, and there is observed a succession of local plethoras, which cannot be explained by the apparent constitution of the individual. We have more than once met persons, in whom dizziness, dyspnœa, palpitations showed themselves by turns. We have seen a woman who presented a succession of hyperemias. She began by complaining, for fifteen days, of a violent headache, accompanied by continual dazzling, vertigo, disagreeable noise in her ears; she staggered in walking, as if she were drunk. These signs of cerebral congestion disappeared, at the same time that there came on an abundant epistaxis which was renewed for several successive days. Scarcely did this epistaxis cease, when she began to feel pains towards the loins, the lower extremities became numbed, and there soon appeared a menorrhagia, which lasted for thirty hours. The patient was thirty-seven years of age, but had not her menses for the last three months; it was nearly at the usual period of their return that the menorrhagia took place. After this phenomena, there was no more appearance of hyperemia towards any organ for a month. At the end of that time the menses did not appear; but without cough, or preceding dyspnœa, some blood was expectorated in a quantity large enough to fill the fourth of an ordinary glass. After this hemoptysis had ceased, signs of cerebral congestion reappeared, and they continued with variable degrees of intensity for twenty days; at the

end of this time a new scene presented itself: the cerebral symptoms disappeared; but the patient voided pure blood by the bowels, and this new flux went on for twelve days: twice or thrice every twenty-four hours she felt a slight colicky pain, which caused her to go to stool, and every time she went she passed from a fourth to half a glass of blood; on some days even the loss of blood was still more considerable. This internal hemorrhage lasted till the time at which her menses should appear, but they did not. They came the following period, but in the form of a hemorrhage so copious as to render bleeding necessary. From this period her health was re-established; menstruation became regular; only some days before they appeared, she complained of headache and some attacks of vertigo; she had flushes of heat in the face, and was troubled with palpitations. We shall now cite a case in which the congestion, primarily seated in the brain, was then removed to the lungs, and became immediately fatal in consequence of the hemorrhage it produced. A man, fifty years of age, entered the *Maison Royale de Santé*, with all the signs characterising great cerebral congestion: this was not removed by a bleeding. All at once the patient was seized with extreme dyspnœa, which continued to increase, and he died at the end of four hours. On opening the body we found the cerebral mass gorged with blood; no other lesion in the brain. But in the two lungs there were found hard and black masses, which presented all the characters of the lesion known by the name of pulmonary apoplexy. The walls of the heart were hypertrophied.* In the preceding case we sought and found the causes of cerebral congestion in the influence of the forces, whether mechanical or vital, which preside over the circulation. Are these congestions also influenced by the different degrees of activity of sanguification: that is, by the greater or less energy of the force which makes the blood? In other words, what is the influence exercised, either by a state of general plethora, or by a contrary state, on the production of cerebral hyperemia? We shall now consider that point.

It is undeniable that, in many individuals, a state of general plethora coincides with the appearance of the symptoms indicating the existence of cerebral congestion; but it is far from being so in all cases. There are even individuals in whom this congestion appears at the very time that they arrived at a remarkable state of anemia. We have just seen, at the *Pitié*, a woman labouring under cancer of the uterus, and very much exhausted in consequence of the great hemorrhages she constantly had from the uterus; yet, she had just died from cerebral hemorrhage. We shall conclude this inquiry by some considerations regarding the part which muscular action may have on the production of cerebral congestions. There is no doubt but violent exertion will predispose to it. The attacks of vertigo, to which the action of turning round gives rise, were followed, in the case which we shall now cite, by phenomena usually attributed to cerebral congestion.

* This is not the only case where we have seen pulmonary apoplexy without spitting of blood. See our next two volumes on the subject.

In the course of the month of December, a law student was at a public ball, where he waltzed for some time with considerable ardour, he fell down suddenly deprived of sensation and motion. Notwithstanding every attention having been paid to him, bleeding, &c., he died. We learned that he had enjoyed excellent health, and had just made a very hearty meal. The body was opened thirty-six hours after death. In the cranium the vessels of the membrane were found gorged with blood, and the cerebral substance was as it were covered with sand (*sablée*) throughout all its extent. The lungs were gorged with an enormous quantity of black, viscid blood. The heart, which was large, presented no lesion in other respects; its right cavities were filled with blood, those on the left empty, as also the aorta. In the abdomen there was nothing else remarkable, but a very considerable venous congestion of the intestinal parietes, and considerable sanguineous engorgement of the liver and spleen. It does not appear to us, as has been frequently asserted, that cerebral congestions are more common at an advanced age. We have seen numerous instances of them in young persons; it is wrong to judge of their frequency at the different ages from that of cerebral hemorrhages, which become common only at quite an advanced period of life; that certainly is not the case with simple hyperemia of the brain. The facts cited prove the thing sufficiently.

The duration of cerebral congestions varies according to each of their forms; and, even in these forms, there are still, in this respect, very great differences. Sometimes the congestion returns incessantly, and that during several months, and even during several years. We have seen individuals who, for almost all their life, were tormented with it. It not seldom is suspended for a shorter or longer period, and then returns under the influence of causes which are appreciable or not. We knew a man, who, during several years, experienced, at the close of every winter, the symptoms of an intense cerebral congestion. These symptoms continued for fifteen days, when they disappeared in order to appear again the following year at the same period. Several authors have spoken of intermitting apoplexies, which, in their return, observed the same regularity as the fevers of this name, and presented themselves with the same types. We observed, some years ago, a very remarkable case of this kind, which we shall here record. A woman, sixty-three years of age, habitually enjoyed tolerably good health, when, one morning on getting up, she was suddenly seized with great illness, vomiting, and a violent pain of the head; a quarter of an hour after these symptoms appeared, she uttered a loud scream, and fell, deprived of consciousness. We visited the patient about half an hour after the fall; we find her in a profound coma; eyes shut, pupils large and immoveable, but the eyelids are raised, and when the conjunctiva is touched with the end of the finger, there is barely produced a slight contraction of the eyelids, and the patient makes no effort to withdraw herself from this contact. Face injected; commissures of the lips not affected; tongue cannot be seen; the four extremities are

in a state of complete relaxation, and the sensibility of the skin covering them appears abolished. The pulse strong and free from frequency; heart beats strongly. This woman appears to us struck with cerebral hemorrhage, considerable enough to engage both hemispheres; we immediately bled her, and had her removed to *La Charité*. After passing the most unfavourable prognosis on her state, what was our astonishment, when the next morning, at the visiting time, we found her sitting up in the bed, possessing all her intellects, and enjoying all the freedom of motion. What occurred to her was as follows: — After the bleeding no amendment manifested itself; she continued plunged in coma till towards six o'clock in the evening; when she came to herself, and according to the account of the sister of the ward, she no longer appeared ill. From this we thought that the woman had nothing but a violent cerebral congestion. When we saw her the next day, she asked permission to leave the hospital; but before returning home, she was to pass through new sufferings. We had scarcely left her (it was then seven o'clock in the morning) when she was seized with vomiting, as on the day before; then she suddenly lost all sensation and motion, and the same symptoms which were observed on her before entering the hospital now returned. This time they lasted longer; in the evening they still continued; no amendment at night; and when we saw her again at seven in the morning, she was still in a profound coma. She was bled; leeches were applied to her neck. Up to one o'clock in the afternoon no change appeared; then the patient opened her eyes, spoke, recovered her intellects, moved her limbs with ease, and a second time was quite well. She then left the hospital. We visit her at her own house; she is quite well, yet she stammers a little, and there is a slight degree of stupor in her countenance. We do not yet suspect an intermitting apoplexy, and no particular medicinal directions were given. The following morning the same symptoms return. They continue the entire day with frightful intensity, and last thirty-five hours; then, as on the two preceding occasions, the patient comes to herself, and recovers the freedom of her motions; but her intellect is somewhat dull, and she speaks not without difficulty. We then asked ourselves, whether we had not to do with one of those diseases described under the name of *masked intermittent fevers?* Ten or eleven hours still remained till the period when the next attack was to take place. We instantly administered, by the mouth, twenty grains of sulphate of quinia; we administered the same dose of this salt in a starch injection, and we placed under each axilla, in each inguinal region, twelve grains of the same salt, mixed up with some fresh butter. We await with anxiety for the patient, and also with ardent feelings of scientific curiosity for what will happen the following morning. Towards six o'clock no symptom developed itself. Thus the fit is at least retarded, and there is reason to think that, if it return, it will be less intense. — Towards noon the patient begins to feel a shivering, which she had not experienced on the preceding occasions; violent headache su-

pervened without vomiting; soon after some convulsive movements agitate the muscles of the face; her intellect becomes disturbed; movements of the limbs not yet changed; pulse accelerated: these phenomena succeed each other in the space of half an hour; then they are replaced by a state of coma, which lasts for about two hours, and then goes off. The patient then continues for some time as if benumbed; her skin becomes covered with a little moisture, and again she appears cured. Sulphate of quinia was immediately administered in the same dose, and after the same manner, as on the day before. No symptoms occurred after.

This fact furnishes a very remarkable instance of an intermittent cerebral congestion, which assumed a tertian type, and which was completely put a stop to by quinquina. Observe, that the third fit was much more severe than the preceding two. The sulphate of quinia was administered, and the next fit becomes, on the one hand, less severe and of less duration; and, on the other hand, it is remarkably modified in the nature of its symptoms. For the first time, some shivering marks its onset; and for the first time, also, its termination is accompanied with some perspiration. Thus, in becoming less severe, the fit approaches nearer in its symptoms to a fit of ordinary intermittent fever.

We have had an opportunity of observing, at the *Maison Royale de Santé*, another case of bad intermittent fever, the prevailing symptom of which was profound coma. The individual attacked with it was still a young man, residing in one of the streets adjoining that of the Faubourg Saint-Denis. The quinquina, given only between the second and third fit, prevented not the return of the latter, during which he died. The fever presented the tertian type. On opening the body we discovered no other lesion than a considerable increase in the size of the spleen, and an intense hyperemia, not only of the brain, but of the lungs, liver, and digestive tube. The grey substance of the convolutions struck us by its brown colour. This colour, which appeared to us the mark of very intense congestion of the convolutions, was noted by Dr. Bailly in the numerous autopsies which he made of persons who died at Rome with the symptoms of comatose intermittent fever of a typhoid character.*

The cases recorded by the physician now mentioned point out in these fevers several of the forms of cerebral congestion which we had already designated. But in none do we find the genuine apoplectic form, such as occurred in the woman whose case we gave a little while ago. We see in M. Bailly's cases that sometimes the coma supervened from the first fit, and went on increasing in intensity in the following fits; and that sometimes, on the contrary, it was only at the end of a certain number of fits that the intermittent fever, till then mild, assumed all at once a typhoid character, with

* *Traité Anatomico-Pathologique des fièvres intermittentes, simples et pernicieuses*, observées à l'Hôpital du Saint Esprit de Rome. Par E. M. Bailly.

predominance of encephalic symptoms.* The following case of M. Bailly's is peculiarly interesting in this respect.

A man, thirty years of age, had been labouring for some time under tertian ague; he came to the hospital the 2d of July, 1822. The 3d, he had a slight fit, after which he took two ounces of quinquina. On the 4th, towards noon, he walked about the ward, felt himself very well, and joked with the other patients. Suddenly he was seized with a violent shivering, which was succeeded by a very intense fever, during which he had contraction and flexion of the forearm on the arm, and profound coma; he died six hours after the fit. The only lesion found in the encephalon was a very considerable injection of the arachnoid, and a deeper colour than usual of the grey substance of the brain. It must not be supposed that in all the cases of this kind the cure can never take place except on condition of giving the quinquina. Thus Frederic Hoffman reports the remarkable case of a young man, twenty-six years old, who had six days in succession, every morning, all the symptoms characterising an attack of apoplexy. On the seventh day these symptoms did not return, and they did not appear again though nothing was done to stop their return.

Whatever may be the form and progress of cerebral congestion, its termination is far from being always the same. It may prove fatal, either alone, without any other complication, or after having produced in the brain different lesions, and more especially either a hemorrhage or a softening. We shall presently see that it is often the precursor of one or other of those affections.

Cerebral congestion terminates most frequently in a favourable manner; but its return may be dreaded, or, at some future period, a more dangerous disease. It sometimes happens, that certain phenomena, particularly fluxes, coincide with its disappearance, and appear to contribute to it. We have seen a woman, who, for about a month, was tormented with vertigo and other symptoms, which caused us to apprehend an attack of apoplexy; repeated bleedings, a blister applied to the nape of the neck, exercised no remarkable influence on those symptoms. At last she was seized on a sudden with copious diarrhœa; she had, in forty-eight hours, fifteen stools, constituted principally of bile; at the end of this evacuation, which was scarcely accompanied with any colic, the cerebral symptoms disappeared.

We have seen another person, thirty-six years old, who, for five or six weeks, had had headache, vertigo, ringing of the ears: at the same time, he experienced in the left side of the face, as well as in the left extremities, an almost continual formication; at intervals his intellect became dull, he stammered and tottered, when walking, as if intoxicated; at intervals also his mouth became slightly dragged to one side; copious bleeding, various revulsives applied to the skin, as well as to the digestive canal, were resorted to with-

* Oper. cit. p. 155.

out any benefit. At last an epistaxis came on, during which the patient lost at least two pounds of blood; after this hemorrhage, he no longer felt anything with respect to the head, and every sign of cerebral congestion disappeared.

Lancisi mentions a case similar to the one now cited; it was that of a man seventy years of age, who for a month presented in a very high degree the different symptoms of intense cerebral congestion; at the end of this time he had an epistaxis, in which he lost eleven ounces of blood, and from that time out he was cured. To these facts, we add the following, which we witnessed: — A woman, thirty-five years of age, was attacked for some time back with a tic-douloureux of the face; the neuralgic pains suddenly ceased, but were succeeded by a violent pain of head, and a giddiness so intense that the patient could no longer stand up; she had at the same time very painful nausea, and vomited twice a considerable quantity of yellow bile. This lasted for two hours; there was then seen to flow through the nasal fossæ, not blood, but such a quantity of serous liquid, that several handkerchiefs were soon moistened by it. This discharge lasted some hours, and when it ceased the cerebral symptoms disappeared.

It would seem that cerebral congestion should be one of the diseases against which copious bloodletting must certainly succeed. And so it happens in a considerable number of cases: very often have we seen headache, dizziness, tinnitus aurium, numbness of the limbs, &c., disappear all at once after a copious bleeding. But more than once, also, has this remedy been resorted to in vain: the signs of congestion did not disappear; or else, if they were diminished or disappeared immediately after the vein was opened, they are soon reproduced, with as much intensity as before: in some cases too they are rendered more severe, if the individual has been weakened by repeated bleedings. Nor have we seen, under such circumstances, that bleeding from the foot possessed any real advantage over bleeding from the arm; moreover, we are inclined to think that opening the vein generally produced more effect than the application of leeches to the neck or anus.

There are some rare cases in which not only no relief follows the bleeding, but where it produces in the system such a disturbance, that, under its influence, the simple signs of a cerebral congestion are changed into those of an attack of apoplexy, as may be seen in the following case: — A carpenter, seventy-four years of age, tolerably fat, with short neck, muscles well developed, and presenting the signs of hypertrophy of the left ventricle of the heart, (pulse hard and vibrating, strong impulse of the heart's action, which is heard only over a very small extent of surface,) experienced for some time back constant dizziness, when he entered *La Charité*, in the month of February, 1821. His left extremities he felt to be heavy and benumbed; he was bled from the foot. Whilst the blood was flowing, the patient suddenly lost all consciousness; the extremities of the left side became rigid for some seconds; they then

fell into a state of complete relaxation. At the same time, the left commissure of the lips was drawn down, the mouth became filled with foam, and the respiration stertorous. At the end of an hour consciousness returned. The following morning, the mouth was straight; the intellect was restored; but the extremities of the left side were completely paralysed. During the twelve following days this paralysis continued; (leeches to the neck, purgative enemata; blister to the nape of the neck;) it was then completely removed, and the patient was soon able to go out, no longer retaining any traces of the disease.

For a certain number of years back, purgatives have been very sparingly employed in the treatment of cerebral congestions; hence it happens that no advantageous result is obtained from them, in consequence of the inertness and want of activity in those which have been employed. We can state positively that we have derived the greatest benefit from this plan of treatment in more than one case of cerebral congestion; but the purgatives which we administered were strong enough to produce from ten to twelve or fifteen evacuations in twenty-four hours. Some persons, with whom bloodletting has been employed unsuccessfully, were thus cured by purgatives. At this very moment there is in the wards of the *La Pitié* a man, who for several years back has been seized from time to time with violent pain of head, great dizziness, and palpitations. At first we had him bled, still these symptoms continued; we gave him two drops of croton oil, which produced very copious alvine dejections. The following day he neither had headache, nor vertigo, nor palpitations. For several days these symptoms did not appear, they then returned. Two drops of croton oil were again prescribed, and after some copious evacuations which they produced, the signs of cerebral congestion, as well as the palpitations, ceased as rapidly as at first. Eight days passed on without the patient complaining of any thing; after which the pain of the head and dizziness again returned, without being accompanied with palpitations. This time the patient himself entreated us to prescribe the croton oil for him again. We acceded to his request, and it was attended with the same success as on the two former occasions. This individual has not complained since, and he is now leaving the hospital perfectly restored. The three different doses of croton oil do not appear to have distressed either his stomach or intestines. Twenty-four hours after the administration of this medicine, the diarrhœa which it produced ceased spontaneously; the patient asked for something to eat: the abdomen presented not the least trace of irritation.

We should be so much the more inclined to employ a revulsive treatment for the cure of cerebral congestion, inasmuch as we have more than once seen its symptoms disappear only when a flux came to be established spontaneously on different organs. Every one knows that the absence of the menses in women is often accom-

panied with signs of sanguineous congestion towards the brain, which do not cease till the menses reappear. Several women experience every month, two or three days before their time, which in other respects is sufficiently regular, vertigo, flushes of heat in the face, &c., and there is often observed at the same time a difficulty of respiration, which also indicates a congestion in the respiratory tube. The disappearance of hemorrhoids in the two sexes has occasionally given rise to the same symptoms. We have seen, at *La Pitié*, a middle-aged man, who, for four consecutive years, was attacked every summer (towards the month of July) with severe dizziness, which on every occasion ceased at the same time that an abundant discharge of blood by the rectum took place. This blood was exhaled by the mucous membrane; there was no vestige of hemorrhoids in this case.

To these facts we shall add another, observed by ourselves at *La Charité* in which very serious cerebral symptoms, which lasted for several years, suddenly disappeared, at the same time that other organs became affected. A woman, fifty-six years of age, entered *La Charité* in September, 1828. She experienced every day, for the last fourteen years, nervous symptoms resembling those which characterise an attack of epilepsy. The first few days of her entering we ascertained their real nature. She has every day two of these attacks. For several years back she has also had at different times hematemesis, and discharges of blood from the uterus. In other respects she appears in good health; the digestive functions not altered; no lesion of the uterus discoverable. Copious bleeding was employed, which had not the slightest influence on the disease. Ten days after coming to the hospital she was seized with acute pains in the sole of the foot; the entire skin soon became the seat of painful pricking sensations; we soon discovered her to be attacked by the epidemic which then prevailed in Paris. But, what was very extraordinary, the moment this affection developed itself, the epileptic fits, which we saw renewed every day since she entered the hospital, and which had continued in this quotidian form for the last fourteen years, disappeared. The symptoms of the epidemic continued for the last twelve following days; and during all this time not the least trace of the cerebral affection was evinced. A new series of phenomena is next presented—namely, hemorrhages, which appear alternately on the mucous membranes; successively, and at different times, blood flows in great abundance from the nasal fossæ, the stomach, bronchi, vagina, and rectum. The different organs which alternately become the seat of these hemorrhages, no longer manifest any disturbance from the instant the hemorrhage leaves them to go elsewhere. Whilst these different fluxes of blood are taking place, the symptoms of the epidemic are first mitigated and then disappear; the epileptic attacks are not reproduced; the hemorrhages cease one after another, and the woman leaves the hospital in perfect health. So rapid a succession of phenomena, affecting so many different organs,

is very remarkable; and it is really astonishing to see alarming nervous symptoms disappear so suddenly, the continuance of which for a length of years, seemed to announce that they depended on a deep-seated lesion of the brain or of its coverings.

We have now sketched the principal traits of the history of cerebral congestions. Before proceeding, one serious question arrests us. It is this: are the symptoms which characterise the different forms of cerebral congestions, connected in all cases with the afflux of too great a quantity of blood to the brain? do they depend solely on that cause? are they not sometimes seen as the effect of a quite opposite state of the nervous centres, or, in other words, of their anemia.

It is a law in pathology, that, in every organ, the diminution of the quantity of blood which normally it should contain, produces functional disturbances, as well as the presence of an excessive quantity of blood. And what is more, in both cases these functional disturbances are precisely similar. Let impoverished or too thin blood traverse, for instance, the cavities of the heart, palpitations will be the result, just as if too much blood distended it. Dyspnœa comes on equally soon, whether the lung be the seat of a greater or less hyperemia, or whether the air, on entering the pulmonary vesicles, does not find enough of blood there to arterialise. Dyspepsia equally recognises, for its causes, abnormal paleness of the mucous membrane of the stomach, and a more or less intense sanguineous injection of this membrane; we might multiply such examples *ad infinitum*. The nervous centres might afford a considerable number of them. Thus we have found, more than once, the brain and its membranes completely bloodless in children who died in the midst of convulsions; we have also seen the state of coma, in which many of their diseases terminate, coincide with remarkable paleness of the nervous centres. Several times also in adults we have been struck with the complete absence of colour in the brain, perceptible principally in its grey substance, in cases wherein during life cerebral phenomena had taken place, such as delirium, convulsive movements, coma. Do not animals also who are bled to death exhibit symptoms of this description?

We have often seen individuals who seemed to be completely anemic; their face was extremely pale, and their entire skin presented a colour like to that of wax; these persons could not walk without panting very violently; even when in a state of rest their breathing was short. They were harassed with palpitations; they digested with pain to themselves; some even rejected the little food they put into their stomach. At the same time they had headache, giddiness, vertigo, *tinnitus aurium;* some even experienced, either at intervals or continually, numbness in the limbs; others had before their eyes a thick mist; or else they were tormented with hallucinations of vision or of hearing. These persons had experienced for a long time back copious hemorrhages in different parts, either by the nasal fossæ, or by the rectum, or the uterus, and they habitually presented the phenomena which several persons

momentarily exhibit when they are just after being bled. It must be admitted that the brain in such cases is disturbed in its functions, because it is no longer suitably stimulated or nourished by the too poor or too diluted blood which the heart sends to it. In these circumstances it is oftentimes only necessary that a certain time should have elapsed since the cessation of the hemorrhage, when, according as the blood is renewed, the phenomena occasioned by its subtraction are seen to disappear. But they often continue; digestion in particular remains so laborious, that the system is unable to repair its losses. It is then that we have more than once employed with decided success the preparations of iron, and particularly the subcarbonate. Under the influence of this medicine, we have seen the digestion re-established, palpitations cease, the respiration become free, and at the same time the cerebral symptoms disappear. Thus the same symptoms, according to the diversity of the cause producing them, yield equally, sometimes to bloodletting, sometimes to iron taken into the stomach every day in the dose of from ten to thirty grains and even more.

Without there being any loss of blood, this fluid may be modified in such a way, as to give rise to the disease known by the name of *chlorosis;* in such case, the organs receive their stimulus and nourishment from impoverished blood. Thus, they are disturbed in their functions in the same manner as if a hemorrhage had taken place. In young chlorotic girls, the functions of digestion, circulation, and respiration are modified, just as in persons who have been subjected to great losses of blood; with such persons also, the innervation evinces its suffering by symptoms and phenomena of the same kind, and iron is here also one of the best means to be employed.

If now, we leave the simple observation of facts, in order to endeavour to account for them, we shall soon satisfy ourselves of the insufficiency of the Brunonian dicholomy to explain the symptoms which supervene after cerebral hyperemia or anemia, and which are most frequently similar. These symptoms do not necessarily indicate either the hypersthenic or the asthenic state. They may be owing to a mere perversion of the cerebral influence, a perversion which is no more connected with an excess, than with a deficiency of life, and which results from this circumstance, that the brain must live another life for this sole reason, that it no longer receives its normal quantity of blood, and not merely because it is then less excited.

But this is not all: when we have referred the symptoms to a hyperemia in one case, and to anemia in another, have we come to the bottom of the subject? By no means; for this hyperemia and this anemia are themselves mere effects, which, a thing very remarkable, the same influence can often produce: thus, by an emotion of the mind, the skin of the face becomes red in one person, and pale in another.

In the nervous centres, as elsewhere, before the production of

hyperemia or anemia, we must conceive a primary modification of the force, whatever it is, which subjects the cerebral circulation to certain rules. In the midst of these numerous currents, of these oscillations of globules, which pass within the organic tissues, how many causes constantly presented, and whose influence is entirely unknown to us, may derange a current, and modify the distribution of the globules. Thus, either electricity, or the hygrometric state, &c., may act on them, as so many forces, or, in other words, as so many causes of phenomena.

When we thus examine minutely the grounds of the question, we soon see that hyperemia and anemia, in the brain, as in other parts, are themselves but secondary phenomena — mere effects. But these effects, inconstant and variable, do not necessarily follow the action of the cause; they may be wanting, and yet the symptoms will still continue; for they depend less on the state of cerebral hyperemia or anemia, than on the organic modification which precedes them, and which causes them. Thus, our *post-mortem* examinations show us, for the explanation of identical symptoms, sometimes a state of hyperemia, sometimes a state of anemia, sometimes nothing unusual in the quantity of blood contained in the brain; and in this brain, moreover, no lesion appreciable by our present means of investigation; the reason is, because these means do not show us all; by them we as yet discover nothing but effects; the material modification which incontestably precedes the latter, requires not their production in order that disturbance may take place in the functions of the organ. However, once produced, the different lesions which the present state of anatomy is calculated to reveal, may give rise to phenomena which depend on them alone, and which establish their diagnosis. Thus, the disturbances of motion, sensation, and intellect, which accompany a hemorrhage or softening of the brain, have no longer the same physiognomy as in the case where they are connected with simple cerebral hyperemia, and as in the case where they are not explained by any of the lesions which our scalpel can reveal to us.

It is obvious of what importance these considerations are for the solution of more than one problem of therapeutics. It is only by admitting, for example, that every case of delirium is not the result of cerebral congestion, that we can conceive the truly marvellous effects produced by opium in certain cases of delirium, called nervous, to which those persons in particular are subject who take alcoholic liquor to excess. The following case in point recently presented itself to us. A man, of middle age, subject to intoxication, entered *La Pitié* with erysipelas of the face. When this inflammation was on the point of subsiding, the patient was seized all at once with furious delirium; he was leeched and bled from the arm without any advantage. I determined to try the use of opium. I prescribed forty drops of Rousseau's laudanum in a five ounce mixture, and recommended a spoonful to be given him every hour. This direction was complied with; still no amendment took place, and the next morning the delirium continued in all its inten-

sity. I still am not discouraged, and I add a drachm (*un gros*) of Rousseau's laudanum to the same quantity of liquid. After he had taken it all, the patient fell into a profound and tranquil sleep, and when he awoke, he was in full possession of his reason. The same day he began to eat, and left the hospital, two days after, in good health.

SECOND ORDER.

OBSERVATIONS ON HEMORRHAGE OF THE CEREBRAL HEMISPHERES.

The important and numerous works published from the time of Wepfer up to the present day on cerebral hemorrhage, have thrown great light on most points of the history of this malady; however, in proportion as science progresses, it frequently calls in question many accredited opinions, and constantly requires that new facts should be submitted. Such was our aim in publishing the following cases, and the recapitulation which follows them. Among the cases we have collected, we thought it right, more particularly to make known those in which the hemorrhage is limited to certain circumscribed portions of the cerebral hemispheres, contrasting them with those in which the hemorrhage had its seat simultaneously in several parts of these hemispheres. This is the point of view which has determined the order according to which our cases are ranged.

SECTION I.

PARTICULAR CASES.

Case 1.—Clots of blood scattered through the substance of the cerebral convolutions—Sudden loss of intellect—General relaxation of the extremities—Death in the midst of a state of coma fifty hours after the first appearance.

A man, forty-nine years of age, was brought to the *Maison de Santé* (September, 1830) in the following state: state of coma from which nothing could arouse him; he resembles a person plunged into a deep sleep; inspiratory movements succeed each other at long intervals; the four extremities, when raised, fall as inert masses; severe pinching has not the effect of making them move, nor is the expression of the countenance modified by it. Lips not pulled down; tongue cannot be seen; pulse only fifty-seven; such was his state on the morning at the visiting hour. We were told, that having been subject for some time to some slight transient disturbance in his ideas, this man, who had used alcoholic liquors to excess, had had violent dizziness the day before we saw him; then towards two o'clock, he suddenly lost the power of

speaking, seeing, and hearing, and at four o'clock he fell into the state just described. Such was the account we got. A copious bleeding was prescribed, sinapisms to the legs, and diluent drinks. The following morning his state was the same, except that the inspiratory movements, which were so very slow the day before, were accelerated, without the frequency of the pulse being increased. Thirty leeches were applied to the neck, and the head was covered with a bladder full of ice. In the course of the day the respiration became more and more embarrassed, and the patient died at four o'clock in the evening.

Post-mortem. — Considerable injection of the vessels of the meninges. On each side, over the convexity of the hemispheres, the convolutions presented a sort of fluctuation in five or six points, each the size of a ten sous piece. We had scarcely removed from one to two lines of the cerebral substance over these fluctuating points, when we found, immediately beneath it, some blood slightly coagulated, contained in a small cavity of the capacity of a large hazel nut. Around this cavity, the parietes of which were of a yellow colour, the cerebral tissue presented a bright red dotted appearance, but without any change of consistence. There were also from seven to eight small clots seated in the convolutions of the upper surface of the right hemisphere, and nearly as many on the left. We found no other lesion in the encephalon. The walls of the heart were obviously hypertrophied.

Remarks. — This case presents the very rare example of a hemorrhage of the cerebral convolutions, without complication of any other effusion of blood in the remainder of the encephalon.* The individual who was the subject of it, had nearly the same symptoms as those which are usually produced by a violent hemorrhage taking place in the substance of one of the hemispheres. Dizziness preceded the attack of apoplexy: the latter presented, as a predominant phenomenon, the suspension of the senses, and of the faculty of speech; then there came on a state of coma, in which the patient died, fifty hours only after the appearance of the first symptoms. The respiration was accelerated only towards the termination, and the pulse continued free from frequency up to the last. The absence of hemiplegia is accounted for by the presence of the apoplectic clots (*foyers*) in both hemispheres. We shall not forget to remark, that around each of these clots there existed, for the space of some lines, a bright red injection of the cerebral pulp. The nature of the effused blood attested the recent date of the hemorrhage.

Thus simple compression of the most superficial part of some cerebral convolutions is sufficient to abolish intellect, to suspend the exercise of the senses and of speech, and to produce a coma

* In the second volume of our *Pathological Anatomy*, another case of simple hemorrhage of the convolutions is cited, found in an individual who died suddenly after strong cerebral excitement. The reader is requested to compare the two cases.

which proved rapidly fatal. We find the immoderate use of alcoholic liquors a predisposing cause of cerebral hemorrhage. The commencing alteration of the intellectual faculties, observed before the attack, is not accounted for by the state of the brain. The coincidence of hypertrophy of the heart and of cerebral hemorrhage should not be forgotten.

Case 2.—Cerebral convolutions transformed into a sort of erectile tissue—Small sanguineous effusions into this tissue—Varicose dilatation of the veins of the pia mater—Perforation of one of them—Attack of apoplexy: death at the end of twenty-four hours—Gangrene of the lung.

A woman, fifty years of age, entered *La Charité*, during the month of October, 1820, in a state of emaciation, the organic cause of which could with difficulty be appreciated. No cough; no dyspnœa; dull sound under the left clavicle on percussion; respiratory murmur more obscure there than in any other part; no sweat; pulse habitually a little frequent; tongue pale and moist; appetite gone. For three weeks, we saw this woman waste away more and more every day; at the end of this time she was suddenly seized with attacks of vertigo, which were succeeded by loss of consciousness after two hours. At the morning visit, her intellectual and sensorial faculties appeared entirely suspended; the limbs, when raised, fell by their own weight; those of the left side insensible to pinching; the right not so much so; respiration stertorous; pulse hard, but free from frequency. Death the same day towards evening.

Post-mortem. — *Cranium.* — Vein ramifying over the network of the pia mater covering the cerebral convolutions were very much dilated at intervals; these were genuine varices. Their parietes, soft and friable, were torn and reduced to a kind of pulp by the least force. A layer of coagulated blood, at least six lines in thickness, covered the entire upper surface of the right hemisphere. After subjecting these parts to a stream of water, it was ascertained that one of the large varicose veins, which traversed the pia mater on the right, was perforated; it presented a large orifice with irregular-jagged edges, which was in some measure stopped by a small clot of blood. On the posterior lobe of the same right hemisphere, there were remarked four convolutions, which, at their surface, were changed into a bright red, areolated, fungus-like tissue, in the midst of which appeared three or four small cavities, each of which might admit a pea, and were filled with blood. In these parts the cerebral pulp presented not the least softening.

Thorax. — The summit of the right lung presented a portion, the size of an egg, black as ink, and changed into a liquid putrid substance, which exhaled an infectious odour. No communication as yet seemed to be established between this part, which was evidently gangrenous, and the bronchi.

Remarks. — This is another instance of lesion of the encephalon limited to the convolutions; but their change differs in several re-

spects from that presented in the first case. This alteration partly existed for a very long time before any cerebral symptom developed itself. The dilatation of the veins of the pia mater, and the softening of their walls, were certainly the effects of chronic disease. That remarkable development of the substance resembling erectile tissue, on the surface of some of the convolutions, was also a chronic affection. The production of this tissue depended, in all probability, on the dilatation of the capillary veins of the cerebral pulp, which were thus affected with the same kind of lesion as theexternal veins in which they terminate. But what is very extraordinary, all this morbid process went on without any appreciable disturbance of the cerebral functions resulting from it. Then a period arrived, when there was a simultaneous laceration of one of the large external veins, and several of the small veins, the dilatation of which gave to some cerebral convolutions the appearance of erectile tissue. — Thence resulted a double effusion of blood, the one being in the pia mater, the other in the pulp of the convolutions; and then only was it that the cerebral symptoms appeared. Violent vertigo was succeeded by a complete abolition of the senses and of the intellect; then coma supervened, in which the patient died. The loss of motion on one side of the body, and its preservation in the other, showed that only one hemisphere was the seat of lesion, which is contrary to what occurred in the first case. We may remark here, that there was no symptom from which we could have suspected the gangrene of the lung observed in this case.

Case 3.—Effusion of blood into the anterior lobe of the left hemisphere of the brain—Hemiplegia on the right side—Remarkable embarrassment of speech—Death on the ninth day.

A labourer, fifty-seven years of age, entered *La Charité* in the following state: — Intellect very dull; extreme difficulty in pronouncing his words; he commences several phrases without being able to finish any; after articulating with great difficulty some few words, there is nothing afterwards heard but an unmeaning stammering: when he is spoken to for any time, he laughs and cries alternately. He can give no account of what happened to him. Face red; eyes injected; left commissure of lips drawn up; this side of the face alone is moveable; still he complains equally whether the left or the right side of the face be pinched; cannot by any effort put out his tongue; the two extremities of the left side are moved with ease, whilst those of the right side are deprived of all voluntary motion; the cutaneous sensibility does not appear to be diminished there. We find that four days previously, this person fell down in the street deprived of consciousness, about eleven o'clock in the morning; that when brought home he did not recover it till the following day, and that since he has continued in the state described. During the four days following, the tongue became dry and black, urine passed involuntarily, pulse frequent, extremities cold, respiration embarrassed, and he died nine days after the attack of apoplexy.

Post-mortem. — *Cranium.* — The portion of cerebral substance which terminates the left hemisphere anteriorly, is marked by a cavity which might contain a pullet's egg, and which is filled by a large clot of blood. This cavity commences an inch below the upper surface of the hemisphere, and half an inch from its anterior extremity; posteriorly and inferiorly it is bounded by the portion of cerebral substance which forms the point of junction of the superior and anterior walls of the left lateral ventricle. But this latter and the corpus striatum are perfectly sound. The parietes of the accidental cavity present on their internal surface a bright yellow colour, which is continued two or three lines in depth. The cerebral substance no where softened. No other appreciable lesion in the brain.

Thorax. — Lungs infarcted, and hepatised also in several parts; heart large; hypertrophy of the left ventricle.

Abdomen. — Red softening of the gastric mucous membrane in its left half; slate-coloured tint of the pyloric portion. Numerous arborisations in the small intestine. Spleen large and very soft.

Remarks. — This case has been cited as an instance of hemorrhage exactly limited to one of the anterior lobules of the hemispheres. According to the theory which attributes the direction of the movements of the lower extremities to the anterior part of the cerebral hemispheres, we should only have found here paralysis confined to the lower extremity of the right side; and yet the upper extremity of the right side was equally deprived of motion. The paralysis extended also to the right side of the face, and the motions of the tongue could no longer be performed. The articulation of the words was become very difficult, a circumstance which is found in accordance with the opinion put forth by Dr. Bouillaud, with respect to the encephalic seat of speech. We content ourselves with noting here these different facts, proposing to ourselves in our recapitulation, to add them to others, for the purpose of resolving the important questions to which we have just referred. At the same time that the power of motion was abolished in one side of the body, sensibility was preserved sound on that side. With respect to the intellect, it was singularly dull; memory seemed gone altogether. The commencement had been marked by a sudden loss of consciousness: and here again there was a coincidence between a cerebral hemorrhage and a hypertrophy of the heart. It was not in consequence of this hemorrhage that the patient died. The perfectly sound state of the brain around the apoplectic clot was a good condition for the absorption of the effused blood. Death was the result of a double inflammation of the lungs and stomach, which particularly evinced itself by the adynamic state into which the patient so suddenly fell. Such a mode of death is extremely rare in apoplectic subjects.

Case 4.—Effusion of blood into the posterior lobe of the left hemisphere—Sudden loss of speech and motion on all the right side—Death on the sixth day.

A house painter, fifty-five years old, who appeared to be of a strong constitution, was brought to *La Charité*, the 7th August, 1820, in a state of complete hemiplegia of the right side. He had had lead colic several times, and still felt acute abdominal pains, when on the 5th of August he was suddenly deprived of speech, and of motion on the right side. On the 7th he presented to us the following state:—Lies on his back; the eyelids of the right side, which were glued together, open less wide than those of the opposite side; the two eyes seem to be equally sensible to the impression of light; the left buccal commissure is drawn upwards and outwards; the tongue on being protruded deviates to the right; the upper and lower extremities of the right side are deprived of all motion; they may be flexed or extended without any resistance being opposed to them. (Bled to sixteen ounces, two blisters to legs, purgative enema.) The blood drawn from the vein was buffed. He was bled again on the next day, &c., and on the day after he was in a constant stupor; respiration loud; involuntary discharge of urine; obstinate constipation. He remained in this state till the 24th, when the sensibility of the paralysed limbs became very much diminished: purgative clysters, &c., were prescribed. On the 24th, for the first time, diarrhœa came on; tongue dry. From 24th to 30th, constant purging; patient is becoming debilitated; intellect sound; he makes an effort to answer when interrogated, but cannot articulate a word. The abolition of speech continued from the time of his entering the hospital. The 31st of August, extreme prostration; groaning; retroversion of the head; left commissure of the lips drawn very much upwards; tongue always dry, and inclined to the right; upper eyelid of the right side always more depressed than the left; pulse small and weak; extremities cold; respiration more and more difficult and stertorous; death.

Post-mortem twenty hours after death.

Cranium.—Vessels of the pia mater very much gorged with blood. No serum in the external arachnoid, nor in the ventricles. In the substance of the posterior lobe of the left hemisphere, behind and outside the optic thalamus, which continued sound, and nearly on the same level with it, we observed a cavity large enough to contain a small apple, which was filled with blood of the colour of iron rust, partly liquid, and partly coagulated. A very fine cellular membrane lined the parietes of this cavity. The cerebral substance around it was of a dirty rose tint, and was a little softened for the extent of some lines.

Thorax.—Lungs infarcted, sound in other respects; heart large; hypertrophy of the parietes of the left ventricle.

Abdomen.—Some red dots on the inner surface of the stomach, towards its great curvature. In several places bright red injection of the mucous membrane of the small intestine, and of that of the

large intestine, the redness of which is found to increase as we approach the rectum.

Remarks. — This case differs particularly from the preceding with respect to the seat of the effusion. Here it existed in the posterior part of one of the hemispheres, in that part which, according to some authors, regulates the motions of the upper extremities; in this case, however, the lower extremity was paralysed as well as the upper. The loss of speech continued from the commencement to the end of the disease; this was even the first symptom, and yet no lesion was found in the anterior part of the hemispheres. If then the third case, which also exhibited loss of speech, seems to confirm the opinions which places this faculty in the anterior lobes of the hemispheres, the present case completely upsets this opinion. We shall remark, besides, that at the commencement the intellect was not disturbed, and that it was not till a considerable time after the attack that stupor supervened. Here again an intestinal inflammation complicated the cerebral affection, and hastened the patient's death, which did not take place till the 26th day; we also found on the walls of the hemorrhagic cavity a pseudo-membrane, which was already organised into cellular tissue. There was further, in this case, around the cavity, a little rose-coloured softening, the existence of which was not indicated by any particular symptom.

Case 5.—Effusion of blood into the posterior lobe of the left hemisphere—Paralysis of the upper extremity of the right side; preservation of sensation and motion in the corresponding lower extremity—Death on the 20th day.

A carpenter, twenty-nine years old, entered *La Charité*, 29th June, 1829. We ascertained that, nineteen days previously, he had all at once lost consciousness; that at the end of twenty hours he began to recover the use of his intellects. The following days he remained paralysed in the right arm. He was bled twice. The day before entering the hospital, he relapsed into coma.

On the 29th, we found him in a profound stupor; not a word could be elicited from him; eyes shut; cheeks a violet tint colour. The right upper extremity was extended along the trunk; when raised, it fell again as an inert mass. The skin of this extremity was insensible to pinching. On the contrary, when we pressed the nails into the skin of the left upper extremity, this limb was quickly drawn back, the muscles of the face became contracted, and the patient moaned. We then pinched gently the lower extremities, which were immoveable and extended, and the patient did not seem to feel it. On pinching them more severely, the two lower extremities quickly performed some rapid movements: we saw them, on the right as well as on the left, carried alternately in different directions; at the same time he uttered some groans. It thus became evident that sensation and motion were lost only in the right upper extremity, and that both these faculties were particularly retained in the corresponding lower extremity. Pulse hard and frequent; respiration hurried. The patient died on the 30th June.

Post-mortem. — *Cranium.* — Some lines below the convolutions belonging to the posterior lobe of the left hemisphere, two inches anterior to the point where this lobe touches the occipital, it was marked by a cavity capable of containing an ordinary sized nut, and was filled with a blackish brown clot of blood. At the bottom of one of the anfractuosities situated above the effusion, was observed a cleft, through which the anfractuosity communicated with the apoplectic cavity; some liquid blood traversed this cleft, and had raised the pia mater which lined the anfractuosity. The parietes of the cavity, containing the clot of blood, were of a bright red; and around it, for the extent of two or three lines only, the cerebral pulp had lost its usual consistence. The large arteries at the base of the brain presented numerous cartilaginous or bony patches.

Thorax. — Lungs infarcted; heart very large; hypertrophy of the parietes of the two ventricles, with dilatation of the cavity of the left ventricle. Some ossifications at the aortic valves, as well as in the aorta itself.

Remarks. — Here again is a case where the sanguineous effusion was exactly limited to the posterior part of one of the hemispheres: it is but inconsiderable, and nearly touches the convolutions: it presents this remarkable circumstance of a communication between the apoplectic cavity and the exterior, by means of the rent at the bottom of an anfractuosity. Here the upper extremity opposite to the side of the hemorrhage was the only one affected; the corresponding lower extremity remained sound; so that this particular case is confirmative of the opinion which places the seat of the motions of the upper extremities in the posterior part of the hemispheres; but we must not forget that the fourth case gave us quite an opposite result. The patient was perceptibly getting better, when, three days before his death, he relapsed into that state of coma which had existed at the outset of his affection. Did this relapse coincide with the time when the blood strove to make its way so as to cover the external surface of the brain, by escaping through the rent made in a point of the walls of the apoplectic cavity? The death did not take place till the 20th day; there was, as yet, no appearance of the formation of a false membrane on the walls of the cavity containing the blood. We have seen that it was already very well formed in the patient who forms the subject of the fourth case, who died on the 26th day.

In this patient, again, there was aneurism of the heart.

Case 6. — The subject of this case was a woman, fifty-five years of age, who appeared to have been originally of a strong constitution. From the period at which she ceased to menstruate, namely, at the age of forty-seven, she became very fat, and was troubled with constant giddiness. Four years after she had a slight apoplectic attack, which went off in a few days. After four years more she had another attack, with entire loss of consciousness, for which she was blistered, &c. After about a week, she was removed to *La*

Charité; when she presented the following state: — Countenance flushed; paralysis of the upper eyelid of the right side, with deviation of the globe of the eye outwards; unable to protrude the tongue; hearing obtuse; loss of voice and of speech; the patient, who seems quite dull, hears, however, what is said to her, but cannot answer, except by making signs with her head. Motion in the two extremities of the right side destroyed; fæces and urine passed involuntarily; pulse hard, and free from frequency; leeches were several times applied across the jugular veins, and purgative clysters administered. On the 19th, she appeared to be getting better in every respect except as to speech; but, on the 25th, she relapsed into coma, respiration became more and more difficult, and she died on the 27th.

Post-mortem. — *Cranium.* — In the substance of the middle lobe of the left hemisphere, external to, and a little above, the point of junction of this optic *thalamus* and the *corpus striatum*, was found a collection of blood (about six ounces), of which one part was liquid and the other coagulated. A fibrinous layer, not organised, covered the inner surface of the walls of the cavity containing this blood. For the space of two or three lines around it, the cerebral pulp was a little softened.

Thorax.— Lungs generally infarcted, hepatised in several points. Heart large; remarkable hypertrophy of the walls of the left ventricle.

Abdomen. — Mucous membrane of the stomach presented a greyish tint. Liver very large, greasing the scalpel.

Remarks. — The seat of the hemorrhage is here in the very centre of one of the hemispheres; and there is hemiplegia. Theory might have anticipated this; but the circumvolutions were not at all altered, and yet the intellect was not sound: No alteration in the anterior lobe, and yet there was complete loss of speech. Here then we have in succession three facts (cases 4, 5, and 6), in which the lesion resides once in the anterior lobe, another time in the posterior lobe, and once in the middle lobe, and in these three cases there was equal loss of speech. In this case the dizziness for a long time preceded the apoplectic attack of which she died. We did not find in the brain any trace of that which she had had four years before. Perhaps she was then attacked merely with simple cerebral congestion, sufficiently severe to produce the symptoms of hemorrhage, of which we have already seen instances. Neither will the state of the brain account for the return of the coma two days before death.

Case 7. — Effusion of blood into the middle part of the right hemisphere. Some softening of the cerebral substance around this effusion. Death on the seventh month.

A periwig maker, seventy-one years of age, of a good constitution, fell suddenly, deprived of consciousness, on the 15th of May, 1820. This loss of consciousness lasted but for some hours. When he came to himself, he found that he was paralysed in all the left side

of the body. He entered *La Charité*, June 28, and presented the following state:— Pain towards the summit of the head, particularly on the right side; sight and hearing weaker on the left than on the right; left buccal commissure immoveable; the right drawn out; tongue inclined to the left side; complete loss of motion in the upper and lower extremities of the left side; sensibility of these same members very much impaired, but not quite extinct; obstinate constipation; pulse full, a little frequent; intellect perfect. On the 4th of July it was observed that the left side of the thoracic parietes was covered with an enormous anthrax. A crucial incision was made into it a considerable depth; whitish eschars were detached from it by degrees; towards the end of August it was scarcely cicatrised. During the month of September another anthrax, still larger than the former, appeared in the supra-spinous fossa of the left scapula. Other smaller ones appeared in succession in the vicinity of this latter one, and always on the left side. At this time the paralysed limb became atrophied, and permanently contracted, the forearm on the arm, and the leg on the thigh. He complained when we attempted to move his limbs. He passed his urine and fæces involuntarily. Towards the month of October he became very feeble; scarcely ever spoke: large eschars formed on the sacrum; the contraction of the left upper extremity ceased, whilst its immobility remained. He died the 21st of November without his respiration having become stertorous.

Post-mortem. — Complete marasmus, extremities rigid, broad ulcers on the sacrum and trochanters.

Cranium. — Its walls very brittle: dura mater strongly adherent to the vault of the cranium; arachnoid of the convexity a little opaque; right hemisphere of brain presented a cavity capable of containing a middle-sized apple. This cavity at an equal distance from the two extremities of the hemispheres, near the convolutions of the upper surface, external, superior, and posterior to the *corpus striatum*. Its parietes were lined by a cellular membrane, dense, very resisting, in the tissue of which numerous vessels were ramified. By its inner surface, this membrane adhered closely to the cerebral substance which is removed along with it. The cavity is filled with a softish substance having the colour of iron rust. The surrounding cerebral substance is softened to the extent of four or five lines. The softened portion has a slightly yellow tinge. Some little serum in the ventricles and at the base.

Remarks. — We have met a symptom here which did not present itself in any of the preceding cases, namely, the flexion with which the paralysed limbs were affected at a certain period of the disease. The lesions found in the brain do not sufficiently account for it; for the softening in this case was not greater than in the preceding. The atrophy of the paralysed limbs may be referred to the long duration of the paralysis. We seen here, as in the other cases, paralysis of the face, that of the organs of the senses existing on the same side as paralysis of the limbs, and the tongue deviating, when

protruded towards the paralysed side. Still amidst these disturbances of sensation and motion, the intellect remained entire; the speech was not affected. The lesion, however, was similar in its seat and nature to those in the above-mentioned cases, where the intellect was disturbed and the speech entirely lost. What difficulties! Affecting not to see them certainly is not resolving them. This is the first time we met so perfectly organised a membrane around the effused blood, which may be referred to the long duration of the disease.

Case 8.—Cavity filled with a serous liquid in the middle part of the right hemisphere. Two years before death, symptoms of cerebral hemorrhage.—Hypertrophy of the heart—Pulmonary apoplexy.

A man, sixty-one years of age, experienced, from his youth, some oppression whenever he exerted himself; the effort to ascend a staircase brought on insupportable beating of the heart. He had met, at different times of his life, distressing annoyances which made a great impression on him, and visibly aggravated his state. In the month of February, 1820, he felt for the first time very intense headaches, and dizziness so severe that it obliged him to discontinue his business. Four days after experiencing these symptoms, he suddenly fell deprived of consciousness. He was immediately bled from the foot, and in about a quarter of an hour his intellectual and sensorial faculties returned; but the left upper extremity was weaker than the right; the patient felt it heavy. He sustained himself equally well on his two legs. This partial paralysis lasted from fifteen days to three weeks, then disappeared entirely. But from that period he retained the headaches and frequent dizziness, which often compelled him to sit down lest he should fall. Dating from the month of September, 1821, the dyspnœa, as also the palpitations, became more and more violent, and the dizziness became more frequent. The patient was now unable to attend to his ordinary business. He was bled repeatedly both locally and generally. He wasted away very much, still retaining some appetite. On the 21st of January, 1822, after his dinner, syncope came on which lasted for some minutes. During the night he laboured under extreme difficulty of breathing, and had very distressing fits of cough. On the following day his legs appeared infiltrated for the first time. He entered *La Charité* on the 26th of January; and at the visit on the 27th he presented the following state: — Orthopnœa; face puffed; lips had a violet appearance; œdema of the legs and hands; cough frequent and dry; beating of the heart very violent, the impulse being very strong in the præcordial region, and extending over a considerable surface; pulse frequent, small and irregular; tongue natural; reluctance to take food, for fear of augmenting the oppression. Up to the 31st all the symptoms became aggravated, and on the 31st he expectorated about three ounces of blood mixed with aërated mucus. On the 1st of February prostration became very great; respiration blended with rattle; cough dry;

fæces passed involuntarily; pulse extremely weak. Died on the morning of the 2d.

Post-mortem eight hours after death. — *Cranium.* — Dura mater adhering superiorly to the parietes of the cranium; sub-arachnoid cellular tissue infiltrated with a gelatinous and transparent liquid. On cutting from above downwards, and layer by layer, the substance of the cerebral hemispheres, we find in the right hemisphere a cavity with its parietes nearly contiguous, containing some drops of serum situated in the centre of the middle lobe, a little above and outside the lateral ventricle. This cavity extended two inches from before backwards, and one inch vertically. Around it for the space of two or three lines, the cerebral substance, of natural consistence, is of a yellowish tint. Its parietes were lined by a smooth, consistent membrane, about a quarter of a line thick, similar to a serous membrane.

Thorax. — Heart very large; considerable hypertrophy of the walls of the left ventricle; dilatation of its cavity; cartilaginous points on the valves surrounding the orifice of the aortic ventricle; right cavities distended with large clots of blood, deprived of colouring matter. In the centre of the lower lobe of the right lung we find a portion of the pulmonary tissue of the size of an orange, black, hard, not floating in water, and from which there is expressed a deep brown liquid. The same lobe contains several other similar masses, but smaller. Some were also found at the base of the left lung. The two lungs are moreover very much congested in every part.

Abdomen. — The gastric mucous membrane presented a slate-coloured tint; considerable venous injection in the parietes of the small intestine; red tint on the free edge of its valves; a brown red mucus on its interior; liver gorged with blood.

Remarks. — The apoplectic symptoms experienced by this person, two years before his death, might have depended on simple cerebral congestion carried to a high degree. There was, however, then, in the substance of the brain, a hemorrhage, inconsiderable no doubt, the existence of which was proved by the cavity found in the right hemisphere; the loss of consciousness was of but short duration, and the partial paralysis which succeeded it, also soon disappeared. We should note here the intensity of the dizziness preceding and following the hemorrhage. In this case, again, there was a coincidence between the latter and the existence of an old affection of the heart; and does it not appear that it is to this affection we must attribute, at least as a predisposing cause, the double hemorrhage which attacked alternately the brain and lung?

CASE 9.—Effusion of blood into the corpus striatum of the right side—Sudden loss of consciousness—Hemiplegia on the left—Death the fifteenth day.

A woman, forty-eight years old, addicted to wine, fell, suddenly deprived of consciousness, the 16th of March, 1823. A little time after she was bled; at the end of two hours she came to herself.

She entered *La Charité* the same evening. On the next morning, we found the two extremities of the left side completely deprived of motion and sensation. The right commissure of the lips was drawn upwards; intellect perfect; pulse hard, vibrating, a little frequent (she had blisters to the legs, and purgatives). On the following day, a visible amendment; sensibility restored in the paralysed side; the left lower extremity begins to perform some movements; the left upper extremity as much paralysed as on the preceding day. The 19th, she moves the leg and thigh of the left side with ease; pulse not frequent (a blister between the shoulders). From this period to 1st April, symptoms of gastro-intestinal irritation manifested themselves; tongue red and dry; great thirst; tension of the abdomen; diarrhœa; delirium soon came on; the patient died in what is called the adynamic state. The paralysis of the lower extremity of the left side had been completely removed, not so of the upper.

Post-mortem. — *Cranium.* — The only lesion presented by the encephalon was in the right *corpus striatum.* Towards the middle part of this substance, some lines beneath its upper surface, was found a small cavity filled with clots of blood. Around them the cerebral pulp was very soft for the space of three or four lines.

Thorax. — Hypertrophy of the walls of the left ventricle of the heart, with contraction of its cavity.

Abdomen. — Gastric mucous membrane very soft and red through the entire splenic portion. Intense redness, and, as it were, granular appearance of the inner surface of the ilium through a great portion of its extent.

Remarks. — It is rare to find hemorrhage so exactly limited to the *corpus striatum* as in the above case. The commencement of the affection was similar to that of the generality of cerebral hemorrhages, whatever be their seat. The sanguineous effusion being inconsiderable, the patient soon recovers the use of her senses, and her intellect continued quite perfect, which, in this case, may be referred to the seat of the hemorrhage having taken place far from the substance of the convolutions. At first, the two extremities of the side opposite to that of the sanguineous effusion were equally paralysed, which at once invalidates the opinion according to which isolated lesions of the *corpus striatum* should modify motion only in the inferior extremity. But this is not all: one of the paralysed limbs soon recovers the power of moving, and that is the lower extremity — that is to say, that limb which, according to the opinion just now mentioned, should alone have continued deprived of motion. Thus, the farther we advance, the more will these facts be found to destroy, or at least to stagger assertions too hastily made. There was no appearance in this case of any curative process having been set up around the hemorrhagic cavity. The most alarming cerebral symptoms had, however, ceased, and it was under a complication of gastro-intestinal inflammation that she sank. She, too, had hypertrophy of the heart.

Case 10.—Traces of an old effusion of blood into the right corpus striatum—Hemiplegia, preceded by loss of consciousness—Death thirteen months after the attack of apoplexy.

A hair-dresser, forty-six years of age, entered *La Charité* the 27th of January, 1822. He told us that, on the 21st of February, 1821, he had had an attack of apoplexy, during which, he said that he had entirely lost all consciousness. On coming to himself, he was paralysed in the two extremities of the left side. By degrees this paralysis diminished, and when we saw him, he merely felt some debility in the left extremities. The arm of this side appeared to him not so strong as the other, and in walking he dragged the leg a little. He also presented all the signs of pulmonary phthisis, of which he died the 11th of April, 1822.

Post-mortem. — In the posterior part of the right *corpus striatum*, nearer its external than its internal part, about an inch and a half below its upper surface, a cavity was found an inch in length, and an inch and a half in breadth. It was filled with a substance, similar in colour and consistence to a concentrated decoction of chocolate. No false membrane extended over the parietes of this cavity. Around it, for the extent of about half an inch, the substance of the *corpus striatum* was transformed into a yellowish pulp. Cavities and tubercles in the lungs, heart normal; ulcerations in the intestines.

Remarks. — Here again the lesion was confined to the *corpus striatum*, and still there is hemiplegia. We may observe, however, that it was in the posterior part of the *corpus striatum* that the hemorrhage took place. The paralysis, though considerably diminished, existed in a slight degree at the time of death. We saw what was the state of the *corpus striatum*, after the lapse of more than a year since the hemorrhage. There was yet no organised membrane on the parietes of the cavity, and around it the cerebral substance had neither the natural consistence nor colour. If we look again, on the contrary, to the 8th case, we shall see that the apoplectic cavity and neighbouring parts presented quite a different appearance, and also that all the symptoms of cerebral hemorrhage had disappeared long before death.

Case 11. — This was a case of a man sixty years of age, who was admitted towards the commencement of November, into the *Maison de Santé*, with a disease of the heart of long standing. The two extremities of the left side were also paralysed; intellect perfect. About three weeks before his admission, he told us he felt his left leg fail under him, and he fell, not however deprived of consciousness. A little after he found the upper extremity of the left side also deprived of motion; the sensibility of the paralysed limbs remained. His dyspnœa increased, as also his dropsy, and he died on the 25th of November, the hemiplegia continuing to the last moment.

Post-mortem. — In the centre of the right optic *thalamus*, there

was found a cavity filled with black blood, of some consistence. — The cavity was capable of containing a large cherry.

Thorax. — Lungs ingested; hypertrophy of the parietes of the heart, and dilatation of its cavities, which were filled with blood; cartilaginous incrustation at the base of the mitral valve; serous effusion into left pleura; close adhesions between heart and pericardium. Two bony concretions developed between this membrane and the proper substance of the heart.

Abdomen. — Considerable injection of the intestinal mucous membrane in different parts; spleen very large, dense, and black; liver gorged with blood.

Remarks. — This case differs from all the preceding, in this, that no loss of consciousness occurred when the hemorrhage came on. — The two extremities of the left side were equally affected with paralysis, though the lesion existed but in one optic *thalamus.*

CASE 12.—Serous cyst in the left cerebral peduncle—Hemiplegia on the right side, of long standing, with diminution of sensibility—Death four years after the appearance of this hemiplegia.

A woman, about sixty years of age, entered the hospital *La Pitié* in the month of March, 1831, with the symptoms of a chronic peritonitis. She has been hemiplegic for the last four years on the right side; the sensibility also on this side is impaired. She told us that one morning on awaking she found himself thus paralysed, though she had gone to bed on the preceding night in perfect health. She states, that neither since nor before this accident had she either headaches or dizziness. She died fifteen days after her admission, without presenting any additional symptom connected with the brain.

Post-mortem. — In the middle of the cerebral peduncle of the left side, we found a cavity, capable of containing a cherry, filled with a greenish serum; it was lined with a dense resisting membrane, the tissue of which seemed to be fibro-serous. Around it, to the extent of some lines, the nervous substance was of a pearl white, and of cartilaginous hardness. Sero-purulent effusion into the right pleura, and also into the cavity of the peritoneum. Adhesions of the intestines by cellular bands which were still soft.

Remarks. — We think that this woman was attacked four years before her death with hemorrhage, seated in the left cerebral peduncle. The lesion found in this peduncle seems to us to be formed according as the absorption of the effused blood goes on. — After the latter disappeared the paralysis still remained, which is explained by the nature of the lesion found in the peduncle; this is the first time we met an induration of the nervous tissue around an old hemorrhagic cavity. But observe, that this examination was made four years after the appearance of the first cerebral symptoms. These symptoms were not very many, but well marked.

Case 13.—Effusion of blood into a great part of the substance of the right hemisphere—Destruction of the corpus striatum, and of the optic thalamus—Escape of blood into the right lateral ventricle—Death two hours after the appearance of the first symptoms.

A man, thirty-seven years old, fell suddenly, deprived of consciousness, in one of the streets near *La Charité*, to which he was instantly conveyed. When examined he was found to be in a state of profound coma. The four extremities completely relaxed, and evince no sign of sensibility; they are quite cold; tracheal rattle already; pulse frequent (sinapisms to the lower extremities). An hour and a half after entering the hospital he died.

Post-mortem. — On removing a few slices of the nervous substance from the right hemisphere, we came to an enormous effusion of blood, occupying a great portion of this hemisphere. Instead of the nervous pulp, we find only half solid, half liquid blood, in which there are suspended some fragments of brain. The optic *thalamus* and *corpus striatum* no longer exist, and the right lateral ventricle is filled with a large clot of blood.

Remarks. — This case presents one of the most rapidly fatal cases of cerebral hemorrhage we have met on record. The severity of the symptoms is here connected with the extent of the lesion; a great portion of the right hemisphere consisted of a vast cavity full of blood; the corresponding ventricle was also filled with it.

Case 14.—Effusion of blood into the middle of the right hemisphere—Other smaller effusions into the anterior and exterior parts of the same hemisphere—Sudden loss of consciousness—Hemiplegia on the left side—Death the fourth day.

A baker, twenty-eight years of age, entered the *Maison de Santé*, October 20, 1830. He had worked hard for some time, and used to drink six or seven cups of coffee every night. He enjoyed, however, good health. On the morning of the 19th October, he fell down suddenly, deprived of consciousness. He was bled. Afterwards he was conveyed to the *Maison de Santé*, where he presented the following state: — Complete loss of consciousness; insensibility and loss of motion in all the left half of the body; strong pressure, made with the end of the finger, on the left transparent cornea, on the ocular and palpebral conjunctiva of this side, produces not the slightest movement either of the lids or the globe of the eye; sight quite gone; pulse small, 100; respiration regular and calm (28 per minute). (A solution of sulphate of soda; sinapisms to the feet, &c.) During the night; sudden and rapid movements of the side not paralysed; pulse small, 120; skin covered with sweat. On the 21st, some difficulty in swallowing; face more injected than on the preceding day. (Thirty leeches to the right side of the neck, sinapisms to the lower extremities, sulphate of soda in barley water.) All the symptoms continued to become worse, and he died on the morning of the 24th.

Post-mortem forty-eight hours after death. — Well marked sanguineous effusion of the sub-arachnoid cellular tissue of the con-

vexity of the right hemisphere; rose-tint of the subjacent grey substance; large clot of blood in the centre of the right hemisphere, on a level with the centrum ovale of Vieussens, external to the corpus striatum and optic thalamus, which are sound. An orange might be contained in the cavity occupied by this clot. Around the cavity, for the extent of four or five lines, the cerebral substance was softened, and marked with a great number of red points. In the anterior and posterior parts of the same hemisphere, there were found several other small sanguineous effusions, with softening of the nervous substance around them. The cerebral pulp, where it is softened, presents an intensely red colour; in some places it is merely dotted; in other parts it is uniformly red, as if the cerebral substance had been steeped in red colouring matter.

This case is remarkable for the number of the hemorrhages which took place simultaneously, or at short intervals from each other, in the right hemisphere of the brain. Around each sanguineous effusion there was intense injection of the brain, with diminution of its consistence. Does not the hemorrhage here seem to be, as it were, the last degree of this lesion? If this latter preceded the effusion, it was only by some seconds, as seems to be proved by the sudden manner in which the disease commenced. We have seldom seen so complete insensibility of the conjunctiva. In most of the cases wherein coma does exist, the eyelids are still seen to approximate when the anterior surface of the globe of the eye is touched. The complete insensibility of this membrane coincided with a loss of sensation on the left side of the face. Such are several of the phenomena observed where the fifth pair of nerves are injured. We satisfied ourselves that this pair of nerves, in this case, was entire.

Case 15.—Effusion of blood into the centre of each hemisphere—Sudden loss of consciousness—Relaxation of the four extremities—Death the sixth day.

A man, seventy-two years old, entered *La Charité*, the 26th of February, in the following state: — Profound coma; general insensibility of the skin; relaxation of the four extremities, which fall again as inert masses, when left to themselves, after being raised; upper eyelids half depressed over each eye; no sign of vision; slight winking when we attempt to touch the conjunctivæ; respiration rattling. We ascertained that, for some time back, this person had frequently fallen into a swoon. On the 25th of February, at eleven o'clock at night, he had had one longer than usual, and did not come to himself again. This was all we could learn. Nothing particular occurred till his death, which took place on the 4th of March.

Post-mortem. — Serous infiltration of the pia mater of the convexity of the hemispheres. At the union of the posterior third with the anterior two-thirds of the right hemisphere, only an inch below the upper surface of this hemisphere, and two inches from the point of junction of this upper surface with the inner surface, there was found a cavity, which might contain a nut, and which was filled

with coagulated black blood. The nervous substance around it was natural. In the left hemisphere, nearly in the same place, there was found a cavity of the same diameter, equally filled with coagulated blood, without softening, or unusual injection around it. Lungs congested; white patches on the external surface of the heart; hypertrophy of the parietes of the left ventricle; bony incrustation at the base of the mitral valve; bony patches in the aorta.

Remarks. — This case affords a striking example of the disagreement so often existing between the severity of the symptoms and the intensity of the lesions. The symptoms were those of very serious cerebral hemorrhage. We might have announced, by analogy with what is most usually observed, that a considerable portion of one of the hemispheres was the seat of a vast hemorrhagic cavity. Such was not the case, however. The effusion was very inconsiderable, but it was double; and the close resemblance of the two effusions, their similar size, their situation in the same part of each hemisphere, the sound state of the cerebral substance around each, are not the least curious circumstances of this case. Was it because the hemorrhage was double, that, small as it was, it gave rise to such serious symptoms? But we shall see in the following case, a hemorrhage, also double, not followed by death, which took place from another cause, after the lapse of nine years.

Case 16.—Serous cyst in each cerebral hemisphere—Old apoplectic attack—Death nine years after this attack.

A woman, sixty-eight years of age, stated to us, on her entering the hospital *La Pitié*, that, nine years before, she had had an attack of apoplexy, for which she kept her bed for at least two years, because during this time she said her limbs were very weak. She then began to get out of bed, and her limbs, by degrees, resumed their usual strength. When she came under our observation, she presented no trace of paralysis, and her intellect was entire. This woman laboured under a carcinomatous affection of the stomach, of which she died about a month after entering the hospital.

Post-mortem. — About two inches below the upper surface of the right hemisphere, at the union of the anterior two-fifths with the posterior three-fifths of this hemisphere, not far from the point where its upper surface inclines, in order to become external, was found a small cyst, with smooth transparent parietes, filled with limpid serum, without any change in the cerebral parenchyma around it. No change could be discovered in this hemisphere; but in the opposite hemisphere, on a level with, and external to, the middle part of the *corpus striatum*, we found a second serous cyst precisely similar to the preceding.

On the posterior surface of the stomach was found a cancerous ulcer.

Remarks. — In this, as in the preceding case, blood was effused at the same time into each cerebral hemisphere, the patient having assured us that she had had but one attack of apoplexy. But whilst,

in the former case, death took place rapidly, in the latter, not only the termination was not fatal, but, at the end of some years, all the symptoms which could announce the continuance of any alteration in the brain were seen entirely to disappear. Thus, in this case, the cessation of the functional disturbances preceded by a long time the complete disappearance of the lesion which caused them.

SECOND SECTION.

RECAPITULATION.

In this summary we propose to detail the different functional disturbances to which the cerebral hemorrhage gives rise, and to investigate how far the differences, which these disturbances present, may be explained either by the extent of the effusion, or by the difference of its seat.

CHAPTER I.

LESIONS OF MOTION.

The most characteristic symptom of cerebral hemorrhage is paralysis. We know of no instance of hemorrhage, however inconsiderable, taking place in the substance of the cerebral hemispheres, which was not accompanied by a diminution, more or less complete, more or less extensive, and more or less permanent, of the power of motion. In the cases above cited it may have been seen, that a very slight effusion was sufficient to produce paralysis; that in general its intensity was in the direct ratio of the extent of the effusion; that it took place no matter what parts of the cerebral hemispheres were the seat of the lesion, and that, in fine, the differences with respect to the seat of the hemorrhage had very little influence in determining what parts of the body were attacked with paralysis.

The paralysis developes itself at the very moment the effusion of blood takes place. It requires all at once its highest degree of intensity, then remains stationary, or goes on diminishing. Sometimes the paralysed part had not previously experienced any disturbance with respect either to sensation or motion; sometimes, on the contrary, the patients had experienced in these parts pricking sensations, numbness permanent or transient, an unusual feeling of cold, a sense of weight, and a certain degree of debility. These different phenomena may announce two things: either the existence of a constant lesion, in the same point of the brain, where at a later

period the hemorrhage shall take place, — as simple habitual sanguineous congestion, a softening which is still inconsiderable, some accidental production; or else the more or less frequent return of a more serious congestion in the part of the brain where the blood is to be effused.

The paralysis following cerebral hemorrhage presents great varieties with respect to its seat, the pathological anatomy is far indeed from being always able to assign the cause of such numerous varieties.

This paralysis may be first distinguished into general and partial. The first is, when the two sides of the body, whether in their entire extent, or in some of their parts, are at once deprived of motion. This general paralysis we have observed under the three following circumstances: —

1st. In the case of simultaneous or successive hemorrhage in the two hemispheres.

2d. In the case of considerable hemorrhage in only one hemisphere, with destruction of the parietes of the corresponding lateral ventricle, escape of blood into this ventricle, and from it into the other cerebral cavities, either through the natural orifices of communication, or through the lacerated septum.

3d. In the case of hemorrhage in only one hemisphere, without effusion of blood into the ventricles, the hemorrhage being considerable enough to have broken down the greater portion of the substance of the hemisphere.

In the case of general paralysis, the four extremities, when raised, fall again as inert masses, and this state always coincides with loss of consciousness and profound coma. Sometimes it continues, and then the disease always terminates fatally. Sometimes at the end of a short period it disappears, and nothing remains but hemiplegia.

Again it may be remarked, that the existence of general paralysis indicates cerebral hemorrhage with much less certainty than paralysis of only one half the body. It is found accordingly in several brain affections widely differing from each other.

Partial paralysis, which has come on suddenly, is, on the contrary, one of the surest signs of hemorrhage in the cerebral hemispheres. This partial paralysis, which is much more common than the preceding, varies also very much with respect to the number of the parts affected. Whatever these parts be, it may be laid down as a law, that the paralysis affects the side of the body opposite to the hemisphere wherein the effusion of blood has taken place. The cases in which the contrary has been observed, are so few in number, that they can be considered but as very rare exceptions to the law just mentioned, which exceptions again have not yet been accounted for. Nor is it easier to say why hemorrhage in one hemisphere produces paralysis in the opposite side of the body. An attempt has been made to explain the phenomenon by the interlacing of the fibres of the upper part of the spinal cord; but in the

first place, this explanation can only be available for paralysis of the extremities; we cannot have recourse to it for that of other parts, as of the face, for instance, the paralysis of which, as well as that of the extremities, uniformly takes place on the side opposite that of the hemorrhage, whilst the nerves distributed to the muscles of the face arise above the crossing of the fibres of the cord.

The paralysis most frequently observed after a hemorrhage of the cerebral hemispheres, is, that of the two extremities of the side opposite that where the effusion of blood has taken place.* The cases we have cited have shown that a very inconsiderable hemorrhage, which affects scarcely a square inch of the substance of the hemispheres, may give rise to this hemiplegia. They have also satisfied us that the hemiplegia is equally produced, whatever be the point of the hemispheres wherein the effusion has taken place. Thus we have met it in cases where the hemorrhage had not passed the surface of the convolutions, just as in those where it occurred in the very centre of either hemisphere. We have also witnessed the hemiplegia in cases of hemorrhage strictly limited to the anterior, middle, or posterior lobe of one hemisphere, to the *optic thalami*, the *corpora striata*, and even to the cerebral peduncles.

When the two extremities are simultaneously affected with the paralysis, they may be so in an equal degree; but this is a rare case; it usually happens that the loss of motion is most complete in the upper extremity. Nothing is more common than to find this extremity wholly deprived of motion, whilst the leg and thigh of the same side are still capable of being moved at the will of the patient. Often too the leg performs considerable movements, when the patient is in bed; only these motions are somewhat slower than those of the opposite side, and the individual himself does not perceive that one of his lower extremities is affected, until he begins to walk; we may even observe that he drags one of the legs along, or that he supports himself on it rather unsteadily.

The moment when the hemiplegia becomes established it coincides in many cases with a total loss of consciousness, and then the fall may take place indifferently in any direction. But when this loss of consciousness does not take place, the patient feels the lower extremity, which has been just struck with paralysis, suddenly withdrawn from under him, and he falls, as a mass, on the hemiplegic side, whilst he preserves all his consciousness. In most of the cases published on cerebral hemorrhage, sufficient care has not been taken to distinguish those where the fall is caused by the paralysis suddenly supervening from those where it coincides with loss of consciousness.

Hemorrhage of the cerebral hemispheres may also produce paralysis of only a single extremity; sometimes of the upper, and some-

* Dr. Bright, vol. ii., p. 306, gives a case of hemiplegia on the left side, with cerebral lesion on the same side. See also Morgagni, Let. I. Epist. ii., § 16.—Translator.

times of the lower. The separate paralysis of the former we have found to be more common than that of the latter. We remember the case of a man, fifty years of age, who, having gone to bed quite well, was astonished on awaking at not being able to move his left arm, or to see with his right eye. This person has now for the last five months been paralysed in the upper extremity of the left side, and deprived of the sight of the right eye. In no other part is there the slightest trace of paralysis; he feels neither headache nor dizziness; his intelligence is perfectly unimpaired, and has not been disturbed for a single moment.

Some cases have been recently published with a view of proving that paralysis of the upper extremities depends on a lesion confined to the optic *thalami*, or to the nervous mass situated on a level with and posterior to them, and that paralysis of the lower extremities depends on a lesion of the *corpora striata*, or of the nervous mass, situated on a level with and anterior to them. To determine the accuracy of this opinion, we too have interrogated facts.* Now, taking those only in which the lesion was perfectly limited, we found seventy-five of them in which this lesion (hemorrhage or otherwise) was circumscribed with sufficient exactness to enable us to solve this question.

Out of these seventy-five cases, we reckoned forty in which the two extremities of one side were paralysed at the same time. Of these forty, there was twenty-one in which the seat of the lesion was the anterior lobe or corpus striatum, and nineteen in which the lesion was seated in the posterior lobe or *optic thalamus*.

Of these seventy-five cases there were twenty-three in which the paralysis was confined to the upper extremity, in eleven of which the seat of the lesion was the *corpus striatum* or anterior lobe, in ten the lesion was seated in the optic *thalamus* or posterior lobe, and in two the seat of the lesion was the middle lobe.

Again, of these same seventy-five cases we found twelve others in which the paralysis was confined to the upper extremity, in ten of which the seat of the lesion was in the *corpus striatum* or anterior lobe, whilst in two the lesion was in the optic *thalamus* or posterior lobe.

From these facts we are led to the conclusion, that in the present state of science, we cannot yet assign in the brain a distinct seat to the motions of the upper and lower extremities. No doubt such distinct seat exists, since each of these extremities may be paralysed separately, but we do not yet know it.

At the same time that the extremities of one side of the body are paralysed, other parts also may be similarly affected, but in different degrees.

* Serres and Foville assert that the lesions of the *corpus striatum* and anterior parts of the brain are followed by paralysis of the *lower extremities* of the opposite side, and that lesions of the optic *thalamus*, or posterior parts of the cerebrum, cause paralysis of the *upper extremities*. Some of the cases reported by Dr. Bright seem to countenance this opinion.—Tr.

These parts are most commonly the following:

The globes of the eyes.	The neck.
The eyelids.	The larynx.
The different parts of the face.	The pharynx and œsophagus.
The lips.	The bladder.
The tongue.	The rectum.

Of these there are none where paralysis is as common as that of the extremities, nor does it develop itself with equal frequency in the other parts. Thus the different parts of the face and the tongue are more frequently the seat of it than the other five above mentioned. Let us trace, however, the paralysis in each of them.

Paralysis of the muscles which move the eyes is denoted by the constant deviation of the latter in some one direction; it is then that strabismus is most generally observed; but this phenomenon itself is very rare, and it is scarcely ever noted in those numerous cases published on cerebral hemorrhage: we have ourselves met it but in a few cases. In order to its production, it is necessary that the muscles antagonising those which carry the eye downwards and inwards should be paralysed.

The muscles constituting the parietes of the cheeks lose the power of contraction much more frequently than the preceding in cases of hemorrhage of the cerebral hemispheres. The buccinator is the muscle whose paralysis is most perceptible. Every time the patient expires, one of the cheeks is observed to be distended passively, and also at the same time one half of the lips corresponding; and when subsequently the patient wishes to masticate, the food introduced into the mouth, and placed on the side of the paralysed buccinator, can be no longer acted on by it, and collects between the cheek and the teeth until removed by mechanical force.

In all the cases observed by us, and in all those published with sufficient detail, the paralysis of the buccinator muscle has taken place on the same side as that of the extremities.

The passive distension of one of the cheeks we have generally found to take place only in very severe cases, and when there is at the same time loss of consciousness.

The muscles which move the lips often retain all their power of motion, so that their commissures present no deviation whatever. But at other times these muscles are paralysed; and in consequence of their antagonism being destroyed, the commissure of the lips is drawn to the opposite side and outwards, and at the same time it inclines sometimes upwards and sometimes downwards. In the great majority of cases, the deviation of the commissure exists on the side opposite to the hemiplegia; it is consequently on the same side as the paralysis of the limbs that the paralysis of the muscles take place, by which the lips are moved. Oftentimes when there is no motion exercised, and as long as the mouth is shut, there appears no deviation, but this becomes perceptible when the patient speaks or smiles.

The degree of deviation of the mouth is not always in the direct ratio of the degree of hemiplegia. We have seen it very marked in cases where the paralysis of the limbs was very slight, whilst we have found it absent where the hemiplegia was complete.

The tongue, with respect to its movements, presents very different states in individuals attacked with cerebral hemorrhage. In the first place, its movements, in many instances, remain perfectly free. Several persons, who, after having continued some minutes unable to move it, appear suddenly to recover the freedom of its motion: they protrude it abruptly out of the mouth, after a great effort: but there are some movements of this organ which they cannot make until after considerable intervals. In others, again, these movements are completely destroyed, and whatever efforts the patients may make, they cannot protrude the tongue from the mouth. Articulation,* however, may be still possible; sometimes there is considerable stammering, and at other times the patient is unable to articulate a word, and the tongue's motion is entirely destroyed. Others, again, are able to protrude the tongue from the mouth, but not in a straight direction, its apex deviating perceptibly to the right or left. According to our experience, whenever the apex of the tongue deviated, it was towards the paralysed side more frequently than the contrary; the latter deviations, however, scil. towards the sound side, has also been observed. Nothing but mere hypothesis has hitherto been proposed to account for the several modifications in the motions of the tongue.†

Paralysis of the muscles of the neck has been but rarely observed in cerebral hemorrhage. The head then inclines to the paralysed side, at the same time that the face inclines to the opposite side. We have never observed this paralysis as a consequence of sanguineous effusion in one of the cerebral hemispheres.

Paralysis of the muscles of respiration has been observed only in the most serious cases, in those to which the name of *apoplexia fulminans* has been given. In very few cases, complete and sud-

* The affection of the articulation may, as Dr. Bright says, loc. cit., arise from different causes: it sometimes depends almost entirely on paralysis of the muscles of the face; in which case, by supporting the paralysed cheek with the hand, the indistinctness of the articulation is partially removed. In other cases, however, the defect lies in the muscles of the tongue and of the larynx, so that it is not possible to produce the sounds. In the latter cases, Dr. Bright has found the posterior part of the *corpus striatum* the seat either of pressure or of laceration. —Tr.

† That the apex of the tongue should deviate towards the paralytic side, may be inferred *à priori* by considering the muscular power which protrudes the tongue. This is accomplished by the posterior portion of the genio-glossus muscle, of which the fixed point is at the chin, and the moveable point at the base of the tongue. When this portion of the muscle acts, its two extremities are approximated, and the base of the tongue is thus drawn forwards towards the fixed attachment of the muscle. If this attachment be to the right of the median line, the base of the tongue is brought forwards and to the right, and consequently, its apex forwards and to the left. See Lallemand, Letter 1st, p. 23.—Tr.

denly supervening aphonia has been observed.* It was attributed to paralysis of the internal muscles of the larynx.

Paralysis of the muscular layer of the pharynx and œsophagus is observed only in the worst cases, and is usually a fatal symptom. Sometimes, however, it has been found to cease, the power of deglutition return, and the patient restored. In still rarer cases, the dysphagia has been one of the precursory phenomena of an attack of apoplexy.

Paralysis of the bladder is far from being a common phenomenon in individuals examined a considerable time after they have been struck with cerebral hemorrhage. Most of the old apoplectic cases received into the hospitals do not present it. Very few also discharge the fæces involuntarily, and it is very doubtful whether the more or less obstinate constipation, experienced by several of them, depends on paralysis of the rectum. We shall recur, at a subsequent period, to the cause of this phenomenon, when speaking of the state of the primæ viæ in apoplectic patients.

Paralysis, which is really the result of cerebral hemorrhage, once produced, presents the essential character of continuing, even when all the other symptoms accompanying it have disappeared. When death supervenes at the end of some days, the paralysis terminates only with life; when, on the contrary, death does not take place till several months or several years after the apoplectic attack, three states may then present themselves: — either the paralysis continues in all its intensity till the death of the patient, or else it diminishes progressively, without completely disappearing, or else, in fine, it disappears altogether.

In the first of these three states, the paralysis sometimes continues simple, and no other lesion of motion is complicated with it; sometimes it is accompanied at the end of a shorter or longer period, with a certain degree of rigidity, and even of real contraction. In such cases, we usually find, on examining, after death, different alterations around the seat of the hemorrhagic cyst, either more or less extensive softening, or considerable induration of the cerebral substance.

Frequently also, in such cases, the paralysed limbs waste away perceptibly, which probably depends on their continued loss of motion.

In the second state just mentioned, there is a gradual diminution of the paralysis, but at the end of several years we still find traces of it. The limbs may, to be sure, be capable of executing several movements, but they possess not the activity of those of the opposite side; they seem insensible to the patient, who raises them with difficulty; the fingers remain habitually flexed, and the hand cannot

* When aphonia precedes or succeeds apoplexy, it is always to be considered an alarming symptom, as it shows that the internal cause which interrupts the nervous influence, is situated about the base of the brain, and, probably, in the *medulla oblongata*, which is considered the part of the nervous system most indispensable to life.—Tr.

grasp objects firmly; the patients are able to walk, but they drag the limb a little.

When, in such cases, the cerebral hemispheres are examined, there is found, in one point of them, either a serous cyst, or an oblong whitish line, surrounded by a portion of parenchyma a little hardened. We saw one case where a second attack of apoplexy terminated the life of a patient, who, twenty-seven years before, had experienced the first attack. In the time between the attacks, this person felt merely a weakness of the two extremities of the left side; he used them, but with less freedom than those of the opposite side. Towards the middle of the right optic *thalamus*, there was found a hard line of a dull white, being half an inch in extent from before backwards. Around it, there was no alteration of the nervous substance. There was a recent effusion of blood into another part of the brain.

The third state mentioned is that where, at the end of a shorter or longer period, the paralysis entirely disappears, either in all the parts attacked with it, or in some only. The parts where it disappears first, are generally the tongue, the lips, the face, and, lastly, the extremities. In almost all cases the leg recovers its power of motion before the arm: and there are cases where the patients have attained the power of using both the lower extremities with equal facility, though one of the upper extremities was still weaker than the other.

On examiniug the encephalon of persons in whom a paralysis which had existed for a long time has finally disappeared, it may happen that no perceptible alteration is found in the nervous substance; even the whitish line, the last vestige of the hemorrhage, has ceased to exist. But at other times, we still discover in the hemispheres different lesions, such as cysts of variable size; and yet a considerable time before death every species of paralysis had disappeared. Here then is one and the same state of the brain with which, according to the individuals, paralysis may exist or not; another proof that beyond the morbid states appreciable on the dead body, there are others quite as important which escape the researches of the anatomist, and which add their all-powerful influence to that of the former, in permitting or preventing the manifestation of the functional disturbance.

We have already seen that, in cases of paralysis of long standing, the limbs having been deprived of motion become rigid, or present in a more or less marked manner the phenomenon of permanent flexion. But this is not all: in some cases, from the time succeeding the hemorrhage, spasmodic and convulsive motions appear at intervals in the paralysed limbs, and at the same time also the side of the face deprived of motion is agitated by more or less violent contractions. It would seem then that, in virtue of peculiarity of disposition, the effused blood acts as a stimulant on the nervous tissue, which gives rise to irritation of the latter, and to the appearance of those phenomena which have been just mentioned. In

cases of this kind, we have sometimes found after death no particular lesion around the effused blood; sometimes we have discovered around it either a bright red injection of the nervous substance, or a perceptible diminution of its consistence, with a red colouring more or less marked; so that here again we have the same functional disturbances, whether we find or do not find on the dead body alterations to explain them. We also meet, from time to time, cases of cerebral hemorrhage in which, at the same time that one side of the body is affected with paralysis, the other is agitated with convulsive movements. Under such circumstances there is abnormal stimulation of the hemisphere opposite to that where the hemorrhage has taken place. The perceptible traces of this stimulation are found sometimes in the nervous substance itself, which is injected or softened, sometimes in the membranes, which are red, thickened, infiltrated with pus, &c.

CHAPTER II.

LESIONS OF SENSIBILITY.

These lesions are much more constant in cases of cerebral hemorrhage, than those of motility; and, up to the present time, it has been impossible to detect, in the nature or in the seat of the alterations of the brain, the cause which sometimes allows the sensibility to be preserved, and sometimes effects its more or less complete abolition.

We shall now consider these lesions of sensibility: 1st, in the skin; 2dly, at the surface of the different mucous membranes, capable of being touched; 3dly, in the organs of sight, of hearing, of taste, and of smell; 4thly, in the encephalon itself.

1. *Lesions of the cutaneous sensibility.*

These must be considered at two periods; before the hemorrhage has taken place, and after its occurrence. Before the time of the hemorrhage coming on, many persons experience nothing particular towards the cutaneous surface; but with others it is not so. The pulp of the fingers becomes the seat of divers sensations; several complain of having in this part a singular feeling of cold, a sort of numbness similar to what is felt when the hand is plunged into frozen water; others complain of pricking sensations, or annoying formication towards the extremity of the fingers; others, again, fancy that there is a piece of cloth interposed between the skin of their fingers and the body which they would touch: so much blunted is their sensibility.

These different sensations may be confined to the hands; they may extend to the feet; they may even manifest themselves at other points, either of the extremities, or of the face or trunk. We have seen the case of a man, who, before being struck with apoplexy, experienced from time to time complete loss of sensation in some isolated points of the skin of the thorax. Each of these points, which were to the number of five or six, might be about the size of a dollar. On them the skin might be pinched ever so severely, without the patient seeming to feel the slightest pain; beyond these points the sensibility was unchanged, and it soon reappeared in them in all its integrity. These partial abolitions of sensibility were not constant; there were some days when the sensibility was not diminished in any part; then suddenly it disappeared from the parts just now mentioned. Another patient, after having left *La Pitié*, where he had been treated for an intense erysipelas, principally seated in the left side of the face, cranium, neck, and back, entered again at the end of two months with total loss of the sensibility of the different parts of the skin, where the erysipelas had been. Thus the skin of the face of the left side, that of the scalp of the same side, and also that of the neck, from the median line to the level of the top of the shoulder, had lost all sensation. On this same side, hearing, sight, smell, and taste, were also nearly destroyed; the motility of the parts affected had not, however, undergone any change. This patient had for the last six weeks experienced almost constant dizziness, and it was nearly during that same period that was gradually wanting the sensibility in all the portion of the skin previously affected with erysipelas. Was there not in this case a specific affection of the fifth pair of nerves?

The perversions of cutaneous sensibility preceding the apoplectic attack, may develop themselves always in the same point, or seize on different parts one after the other; they may manifest themselves on both sides of the body at once, or confine themselves merely to one; and in the latter case the side which they affect will in general be that which, at a subsequent period, will become paralysed.

Nothing is more uncertain than the time intervening between the lesion of the sensibility and the apoplectic attack. In several cases we have seen the sensibility modified only a few days before the appearance of the symptoms of cerebral hemorrhage; in others, numbness and formications of the extremities manifested themselves some years before the occurrence of the hemorrhage.

Let us now trace the modifications which the cutaneous sensibility may undergo, after the cerebral hemorrhage has appeared.

Abolition of sensibility does not always accompany loss of motion: when it does take place, it is generally seated in the parts whose power of motion has been modified. We have seen some cases, however, in which it was not so. In a man, for instance, who entered *La Pitié*, in the year 1831, we made the following observations:

This person, sixty years of age, after having for a long time ex-

perienced a pain of the head, seated principally in the right anterior lateral part of the cranium, suddenly lost the power of seeing on the same side where the headache existed, and at the same time the pupil of the right eye was contracted in an extraordinary manner. For about six weeks the right eye remained thus deprived of sight, without any other phenomenon appearing. But at the end of this time the right side of the face lost all sensibility, without its motive powers being at first in any way changed. For fifteen to twenty days the sensibility remained thus lost on the right side of the face; then the upper extremity of the left side became evidently weaker than the other, without the cutaneous sensibility in this extremity being changed, and nearly at the same period the muscles of the right side of the face began to be paralysed, and the mouth was slightly drawn towards the opposite side. There was not in this case the slightest loss of consciousness.

We shall not here discuss what the lesion was, which, in the individual whose case we have just now mentioned, produced this double modification of sensation and motion; we mention the case merely to point out the extraordinary circumstance of loss of sensation on the right, and of motion on the left. In this case, again, there is another peculiarity: it is, that the paralysis of motion came on in the left side of the face, that is, in the side opposite that of the paralysed limb. Now this circumstance establishes a striking exception to the law which we previously laid down.

According to the time which elapses from the apoplectic attack, the cutaneous sensibility reappears, and most usually it is found almost completely re-established at a time when the paralysis of motion still remains undiminished. However, the fingers often continue benumbed and cold; but that may depend in a great measure on the privation of motion producing a degree of languor in the capillary circulation.

2. *Lesions of the sensibility of the mucous membranes.*

In those cases where the sight is lost, the eyelids are made to approximate by touching the conjunctiva with the finger. There are, however, cases in which this membrane becomes so insensible, that the end of the finger may be passed over the entire anterior surface of the globe of the eye, without the eyelids approximating, or without the patient's evincing the slightest sign of pain, and that at a time when in other parts the sensibility is still sufficiently acute. One of our cases furnished us with a very remarkable instance of this kind. This insensibility is similar to that which may be produced in animals by dividing the fifth pair of nerves.

On introducing a feather into each of the nostrils, we ascertained in some apoplectic patients a notable diminution of sensation on one of the halves of the mucous membrane of the nasal fossæ. Some have told us that, on introducing their food into each side of the mouth alternately, there was one side in which the contact of the

food with the mucous membrane of the mouth was felt much less distinctly than in the other. We particularly ascertained this diminution of sensibility of one of the sides of the mouth and one of the nostrils in an individual, the corresponding side of whose face was likewise deprived of sensibility, whilst the power of motion remained sound; in no other part was it altered: sight and hearing were also much weaker on the same side than on the opposite side.

These different modifications of sensibility seem to indicate that there are cases where hemorrhage of the cerebral hemispheres, whatever be its seat, exercises an influence on the fifth pair of nerves.

3. *Lesions of the functions of the organs of the senses.*

In a considerable number of cases vision is not affected. When it is it may be so before the hemorrhage takes place, at the very time when it has occurred, or after its occurrence.

Before the hemorrhage, several persons experience, on the part of vision, strange sensations, real hallucinations. With some, all objects appear to be coloured red; others fancy that a red line borders all bodies; a sensation similar to what is experienced when the eyes have been for some time exposed to the impression of a strong light. There are some who cannot look attentively at an object without seeing it dotted with red or black points; others have a constant mist interposed between their sight and the object they are looking at. Some are tormented by the appearance of flies, which seem to them constantly dancing before their eyes.

It must not, however, be supposed that these different hallucinations of vision lead necessarily to cerebral hemorrhage. We have had an opportunity of observing a person who, for several years, was constantly tormented by the imaginary sight of small bodies of different forms and colours dancing before his eyes; if he would look steadily at an object, he saw it dotted with a number of black points; this hallucination, which was permanent, prevented his being able to read or write; he had neither dizziness, vertigo, nor headache; the conjunctiva were habitually red, and he could not endure without considerable suffering a more than ordinary strong light.

Diplopia has been occasionally observed a certain time before the supervention of an attack of apoplexy.

Other persons have been suddenly struck with blindness, and the loss of sight was with them the principal precursor of cerebral hemorrhage. We have seen a locksmith who, after having experienced considerable dizziness of the head for eight days, suddenly lost his sight. After having remained blind for fifteen days, he suddenly fell down deprived of consciousness, and paralysed on the right side; consciousness soon returned; the hemiplegia continued, but what was very remarkable, some time after the attack he began to recover his sight, which however continued very weak with him.

We saw another individual in whom, during the month preceding the attack, the sight was completely lost three different times; he suddenly became blind, the blindness continued from forty-eight to sixty hours; he then recovered his sight.

In a word, individuals have been observed, in whom, for some time before the attack, their vision acquired unusual sharpness.

Such are the principal phenomena which manifest themselves as connected with sight, a longer or shorter time before the hemorrhage supervenes. Their existence proves indisputably, that before the blood is effused there is already going on in the brain a morbid process, either continued or intermittent, the nature of which it would be a matter of great importance precisely to determine.

Once the hemorrhage has come on, the sight may remain unaffected; but it may also be lost. Sometimes it is lost on both sides; that takes place in violent apoplexy, when the hemorrhage is very extensive. Sometimes, on the contrary, the power of vision disappears only on one side; but here, two different cases have been observed: in the one case, the sight is lost on the side where the paralysis of the limbs exists; in the other case, the patient does not see with the eye of the side opposite the paralysed side of the body.

We have investigated how far the hemorrhage occupied a particular seat in those cases, where, after its occurrence, the sight continued affected, and this seat we have never been able to discover. We might cite cases here, either from our own practice, or which have been recorded by other writers, in which we might find different alterations of vision, though parts of the hemispheres most remote from each other were the seat of hemorrhage. We do not admit then, with M. Serres, that sight is lost only when the hemorrhage has its seat in the optic *thalami*, on the level of the commissure. We shall see, as we go on, that lesions of the cerebellum are also accompanied with different disturbances of vision, and in particular with amaurosis. In the face of so many facts, which show us constantly, that the alterations of the brain, in the most different parts, are associated with the disturbance of one and the same function, shall we deny that certain parts of the brain are particularly destined for the performance of certain acts? We would have no right to do so; for it is probable that certain parts of the brain have such a relation with each other, that the lesion of one among them will react in particular on another; and this will probably be the secondary alteration of the latter, unappreciable by the scalpel, which is to produce the peculiar functional disturbance.

The sense of hearing may present before, during, and after the cerebral hemorrhage, the same modifications as the sense of vision. Before the hemorrhage, there are some who are annoyed with buzzing in the ears, continual or intermittent tingling. Several fancy they hear the strangest noises. These hallucinations are, however, far from being the constant prelude to an attack of apoplexy; they may be connected with mere perversions of sensibility, and have nothing whatever to do with cerebral congestion.

We have no particular observations to make on the modifications produced in the senses of taste and smell, by hemorrhage of the cerebral hemispheres.

4. *Lesions of sensibility seated in the encephalon itself.*

Pain of head, more or less intense, dizziness, vertigo, often precede cerebral hemorrhage. There are some persons, who, for several months, are constantly affected with the signs of cerebral congestion; one day it becomes more violent and the hemorrhage takes place. We cannot understand how persons can deny such a precursor, and assert, that it takes place only in cases of softening. We acknowledge besides, that it is often completely wanting, and that individuals may be suddenly struck with cerebral hemorrhage, without ever having before presented the least symptoms referrible to the brain, without having ever complained either of headache, dizziness, &c.

After the hemorrhage, there is no additional phenomenon observed, we merely see the same symptoms continue in a great number of cases (such as vertigo, &c.), as had been the precursors of the disease.

CHAPTER III.

LESIONS OF THE INTELLECT.

In the same manner as when treating of the lesions of motion and sensation these also must be considered, in the periods before the hemorrhage has taken place, and after it has occurred.

Several persons preserve all the clearness and strength of their intellect up to the moment when they are struck with apoplexy. In others, there are observed, a shorter or longer time before this period, some changes in the intellectual faculties; sometimes they are as it were benumbed; sometimes, on the contrary, they manifest an extraordinary excitement. Some patients lose their memory; there are moments when they know neither where they are, nor what they do, nor what they say. We here give some instances of these aberrations of intellect which we have had an opportunity of observing.

A woman, whose reason had been up to that period perfectly sound, gave herself up all at once, without any obvious cause, to violent fits of passion; she became frantic, and was conveyed to *La Charité*, in a state resembling mania; on the very evening of her entering the hospital, she was struck with apoplexy, of which she died in less than thirty hours. On opening the body, we found in one of the cerebral hemispheres an enormous effusion of blood.

A man, about fifty years of age, forgets his own name; he is from

time to time convinced that he is dead; he no longer recognises his own immediate relatives; he remains fifteen days in this state; then he is struck with apoplexy; the *post-mortem* examination agani shows, in this case, an effusion of blood within the hemispheres: no other lesion was discovered.

Another man becomes incapable of attending to any occupation: he remains constantly seated, and his eyes, as it were, weighed down with sleep; we could with difficulty elicit from him some few answers; this state terminated by an attack of apoplexy.

Several similar cases have been seen by practitioners; they clearly prove that before the time the hemorrhage takes place, there may be already in the brain a morbid state, which is the precursor of it, and which may manifest itself by divers disturbances of motion, sensation, or intellect.

Other persons experience, at several different times, sudden losses of consciousness; they fall suddenly into a profound coma, and it is supposed that they are under the influence of cerebral hemorrhage. But this coma disappears, and they are restored to perfect health, until a new determination of blood returns. At last, a time comes when, instead of a simple congestion, by which all these phenomena might be explained, there comes on a real hemorrhage, the effects of which are no longer transient like those of the congestion which preceded it.

Even at the time the hemorrhage takes place, three cases may present themselves with respect to the modifications which the intellect undergoes.

In the first place, it is perfectly sound, and the serious alteration which the power of motion then suddenly undergoes, brings no disturbance on the exercise of the intellectual faculties.

In a second case, the intellect becomes more or less dull, at the same time that the limbs are paralysed. The patient falls into a stupor; others form incoherent resolves, or utter some unintelligible words; however, they are still conscious of the external world, and they are still able to hold relations with it.

In a third case, on the contrary, the loss of consciousness is complete. The patients are plunged into a state of coma, from which the most energetic excitements cannot arouse them. Only sometimes, after being spoken to with a very loud voice for the purpose of awakening them, they open their eyes slowly, and stare for some seconds on the person who is watching them; but they soon relapse into their lethargic sleep.

These differences in the state of the intellect at the time the attack of apoplexy takes place, depend principally on the greater or less extent of the effusion. With respect to the seat of the latter, it has not appeared to us to exercise any great influence on the intellectual faculties. Not only have we seen the loss of consciousness coincide with hemorrhage in all possible points of the cerebral hemispheres, but we have even found it in cases where the hemorrhage had its seat outside the hemispheres, in the cerebellum for

example, or in the *pons Varolii*. Dr. Fabre has cited the very interesting case of an old man, who died of an attack of apoplexy, accompanied with complete loss of consciousness, in whom the nervous centres presented no other lesion than an effusion of blood into the substance of the left anterior pyramid; a very striking example, no doubt, of the wonderful connexion which holds together and brings into unity of action all the parts of the nervous system.

After the effusion of blood has taken place, the coma may remain, the patient does not recover consciousness, and in this case death soon arrives. In the most favourable cases, and which are far from being rare, the state of coma disappears; but even after the individual has come to himself the intellect does not always present the same conditions. In a very small number of cases, it is perfectly re-established; most frequently it remains enfeebled; the patient retains sufficient reason to be able to attend to the concerns of common life; but he has become incapable of deep or profound reflection; he can no longer join, without distress, in a conversation of any length, or of a serious nature, and it is necessary to debar him from it, otherwise his state may be made worse.

Instead of this simple weakness, the intellect may present a more serious alteration. Thus we see a great number of apoplectic patients fall into a real state of childishness, or of senile dotage; they shed tears with extraordinary facility. Others are seized, from time to time, with a delirium, which resembles that so often induced by acute inflammation of the meninges; and, in fact, it may be supposed that in such cases it is caused by the occurrence of an irritation of the arachnoid which covers the affected hemisphere. Madness, in a word, has been seen to declare itself after a cerebral hemorrhage.

There is a phenomenon observed rather frequently after an effusion of blood into the brain: that is, loss of speech. It may exist with a perfect integrity of intellect. Sometimes this accidental dumbness soon disappears; sometimes the speech is not recovered till after the expiration of a considerable time; sometimes, in a word, it continues for ever lost.

Professor Bouillaud published, some years since, a paper containing some curious facts, from which he thought he might conclude, that the formation of speech has for its instrument the anterior extremity of each hemisphere, he having found this part the seat of lesion every time that, during life, speech itself had been lost. What our researches on this subject have led us to conclude, is as follows:—

Out of thirty-seven cases observed by ourselves or by others, relative to hemorrhages or other lesions, in which the morbid change resided in one of the anterior lobes, or in both, speech was abolished twenty-one times, and retained sixteen times.

On the other hand, we have collected fourteen cases, where the speech was abolished without any alteration in the anterior lobes.

Of these fourteen cases, seven were connected with diseases of the middle lobes, and seven with diseases of the posterior lobes.

The loss of speech is not, then, the necessary result of a lesion of the anterior lobes, and, besides, it may take place in cases where dissection fails to show any alteration in these lobes. M. Lallemand* has cited a case in which there was found no other alteration than a softening of the white substance of the left lobe of the cerebellum; in this case, however, to which we shall take occasion to return for another purpose, the faculty of speech was completely lost.

In M. Ollivier's work on the spinal cord,† you will find the case of an individual in whom the phenomenon of loss of speech, at first partial and then complete, occurred. In this case, it was in the pons that the alteration existed; it was found softened at its lower surface to an extent equal, at least, to the size of a filbert.

CHAPTER IV.

LESIONS OF THE FUNCTIONS OF THE ORGANS OF NUTRITIVE LIFE.

Among these functions, there is but one which is specially affected by cerebral hemorrhage; and, again, the latter must be rather considerable, or what comes to the same thing, it must find the individual so predisposed, that a slight effusion will produce in the brain a greater disturbance than would seem to be compatible with the intensity of the lesion. Then the respiration presents a particular character, which is designated by the term *stertorous*. Must we admit, with M. Serres, that this function is particularly affected, in the case in which the hemorrhage is seated in the optic *thalamus* and its radiations?‡

The stertor of the respiration is, in general, a very fatal sign; and individuals who present it in a marked manner seldom escape a speedy death. To account for it, there is found in the dead body considerable congestion of the lungs, and a great quantity of frothy mucus in the bronchi. It is certainly in consequence of the embarrassment of the respiration that persons struck with cerebral hemorrhage die, in the case where the attack is severe, and where they die promptly.

The circulation presents divers disturbances: the heart frequently beats with strength, but this strength is rather in reference to its preceding state than to the cerebral disease itself. The pulse is variable; it is, however, more frequently slow than frequent. The capillary circulation presents nothing observable, except towards the

* Lettre ii. p. 134. † Tom. ii. p. 614.

‡ Anatomie Comparée du Cerveau, tom. ii.

face, which assumes a different appearance according to the individuals; sometimes it is red, considerably injected, and the conjunctivæ participate in this hyperemia; sometimes, on the contrary, it is pale: and it is now known that this paleness should not exclude the idea of a cerebral hemorrhage, and that it does not announce the existence of a serous apoplexy, as was supposed previously to the researches of Portal on this subject.

Among the phenomena which occasionally precede cerebral hemorrhage, or else which follow it, must be placed small effusions of blood, which take place in some persons into the tissue of the conjunctiva.

The digestive functions present no special disturbance, except frequently obstinate constipation, which is not always overcome by drastic purgatives. It should be remarked, however, that the absence of alvine evacuations, in such cases, is far from indicating an insensibility* of the mucous membrane to the action of irritating substances brought in contact with it; for we have frequently found a bright red injection on the internal surface of the intestine, and particularly of the large intestine, in persons, who had had no alvine dejection, though purgatives had been given them several days in succession, either by the mouth or the rectum. Observe, also, that if the employment of these means be continued, the tongue soon

* An observation of Lallemand's on the diminution of sensibility in the bladder, in affections of the brain, may not be here considered out of place: — "It is to the diminution of the sensibility that we must attribute the distension of the bladder, and the inflammation of its mucous membrane, observed so frequently in diseases of the brain and of its membranes, when such diseases are accompanied with stupor, drowsiness, &c. The patient makes no effort to expel the urine contained in the bladder, because he does not perceive the impression made by it on the mucous membrane; consequently it accumulates there, and distends its parietes as long as they admit of it; then the resistance which the urine experiences from them being greater than that presented by the neck of the bladder and the urethra, according as a new quantity comes into the bladder, it flows out in the same proportion, and with the same velocity as it is conveyed by the ureters, that is, drop by drop. As the patients are, in general, soaked in the urine, persons suspect an incontinence, produced by paralysis of the sphincters, rather than the species of retention of which we speak; the result of this prolonged sojourn of a great quantity of urine in the bladder is, that a portion of it is absorbed, as is proved by the urinous smell which the transpiration often acquires; it is partly decomposed there, as is demonstrated by its fetid odour, and the rapid alteration of the silver catheters, which, when drawn from the bladder, are found to be blackened, being covered, in fact, with sulphuretted hydrogen. After death, the mucous membrane of the bladder is found injected, and covered with patches or bloody points: the fundus of the bladder is often full of purulent mucus. The frequency of these inflammations, the circumstances accompanying them, will not suffer us to consider them purely accidental; it is very probable that they are owing to the long-continued impression of the urine, which is already partly decomposed." — Lallemand's Letters, ii. p. 236. It is evident, that when M. Andral denies that the sensibility of the mucous membrane is affected in brain affections, and when Lallemand assumes, that the sensibility of the mucous membrane of the urinary bladder is diminished in the same affection, they do not mean the same kind of sensibility. M. Andral speaks of the organic sensibility; Lallemand, of the animal sensibility. The same reason for the cystitis in the one case will hold good for the gastro-enteritis in the other. — Tr.

becomes red and dry, the pulse becomes accelerated, the temperature of the skin is raised, and a gastro-enteritis soon comes to add its danger to that of the cerebral affection. It would be an egregious error to suppose that in such a case, the inflammation produced in the digestive tube acts as a revulsive, and must lessen the severity of the cerebral symptoms: far from it; we have always seen the gastro-intestinal inflammation exasperate these very symptoms. Besides, this gastro-enteritis may itself arise spontaneously at a period more or less remote from that at which the hemorrhage took place; and, in very many instances, it is of the inflammation of the intestine that old paralytic patients die, in whose brain there exists a hemorrhagic cavity of long standing. Most usually the gastro-enteritis then assumes the form called adynamic, and it is accompanied with the formation of eschars on those parts of the body on which any pressure is made.

SUPPLEMENT.

SANGUINEOUS CONGESTIONS AND EFFUSIONS AFFECTING THE SPINAL SYSTEM.*

When we carefully examine the vascular system of the spine and spinal marrow, in individuals advanced in years, we are struck with the great number of dilatations which we find in different parts of it. This phenomenon, which is frequently observed, results from numerous causes. Some depend on the peculiar distribution and arrangement of the spinal vessels, particularly of the veins, which are entirely destitute of valves; and though their anastomoses are considerable and frequent, it is easy to see that the circulation in them goes on slowly, and with difficulty, and that it may often experience greater or less obstruction. I have frequently found in aged persons fibrinous clots filling all the venous ramifications of the cord, as also those accompanying its nerves — clots, the presence of which, resulting from the prolonged stagnation of the blood in these vessels, proved the slowness of its course.

On the other hand, the direct influence of the respiration on this portion of the circulatory system, produces in it numerous modifications, and becomes even the source of obstructions both in a state of health or of disease. This is what takes place in violent exertions, strong emotions, and in those affections which disturb in a more or less marked manner the act of respiration. From these considerations it is hard to think that repeated congestions in this

* The above has been condensed from Ollivier's Traité de Moelle Epinière, &c. vol. ii., p. 448. — Tr.

deep-seated region should be without its influence on the functions which the spinal cord and its nerves are called on to fulfil, when we see the great disturbance produced by a slight and a nearly analogous congestion in the functions of the brain. This analogy is real with respect to the effects of those congestions, but not with respect to their seat, for it is evident that here it is principally in the vessels external to the cord, and not in those of its tissue, that the afflux of blood exists.

These reflections were suggested from observing several individuals affected with paralysis, sometimes general, but incomplete, without disturbance of the intellectual faculties, and who recovered sensation and motion after a shorter or longer time. I doubt not from different *post-mortem* examinations which I have made regarding this subject, but that we should attribute those symptoms to a more or less rapid accumulation of blood in the spinal vessels, an accumulation which itself becomes the cause of a more copious exhalation of the vertebral liquid. I have in general remarked that the quantity of serum in the vertebral canal was so much the greater, according as there was a greater congestion in the veins of the spine, and of the membranous coverings of the cord. Thus the slowness and difficulty of the course of the venous blood may be here the cause of a dropsy, which is independent of inflammation of the spinal membranes, a fact of which numerous instances have been already cited for the other serous cavities.*

Such is the source of the more or less painful numbness of the limbs with weakness of motion, which is remarked in certain persons, and which extends successively from the lower extremities to the trunk and upper extremities. The patients remain lying on their back in a state of general but incomplete paralysis; the movements of the thorax are sometimes lessened, and the respiration, which is in other respects regular, seems to be performed merely by the external respiratory muscles and the diaphragm; the general circulation does not seem to be sensibly affected. In this paralysis we often see patients gradually recover motion and sensation, and the symptoms disappear from above downwards. The functions of the rectum and the bladder are but little disturbed, and the intellectual faculties remain sound.

Before proceeding further, I shall insist on this latter circumstance to establish the difference which exists between this incomplete general paralysis, and that which is oftentimes observed in lunatics, particularly those whose mental malady results from masturbation, venereal excess, abuse of spirituous liquors, prolonged use of mercury, a great chagrin, fatigue, and exertion of mind; we also see it succeed to insanity which has been accompanied with very violent agitation. In this species of paralysis, the embarrassment of speech is the first symptom which manifest itself, together with a defect of steadiness in walking; this difficulty in the motion of the

* Dict. de Med., art. *Hydropsie.*

tongue and of the lower extremities increases progressively and simultaneously; the upper extremities then become heavier, their movements become embarrassed, and the individuals die after some years in a state of general paralysis, more or less complete, with the remains of a sensibility more or less obtuse.

The progress of this affection presents, as we see, a particular character which distinguishes it from that which I am now speaking. The symptoms of a cerebral lesion accompany the paralysis of the lower extremities, whilst nothing similar is observed in the paralysis which results from spinal congestion, the persons on whom it manifests itself presenting no sign of an affection of the brain. What is more, we see in the numerous cases collected by M. Calmeil, that in certain cases the encephalon of lunatics presents nothing which can explain the phenomena observed during life; I doubt not that sanguineous congestions then contribute, and oftener than is supposed, to produce those lesions of motion and sensation — congestions, the traces of which disappear sometimes at the moment of death, but whose existence is here so much the more probable, as the entire nervous centre is the seat of greater excitation, and of a more considerable afflux of the fluids. The facts which I give will render this opinion much more probable.

When the congestion is very active, it may be accompanied with pains in the dorsal region, which extend from below upwards, according as the paralysis extends in the same direction. It is easily conceived that the serous exhalation, which increases from the moment the sanguineous congestion takes place, should contribute at the same time to increase the paralysis, by compressing the spinal marrow still more. The following case, taken at the *Hospital Necker*, presents an example of these different phenomena:

Case* 55.—Numbness of the lower extremities—Incomplete paraplegia limited to the lower half of the trunk, and extending progressively to the rest of the trunk and upper extremities, accompanied with pain in the back—Absence of cerebral symptoms—Successive disappearance of the phenomena—Cure.

A man, twenty years of age, a locksmith, entered the *Hospital Necker*, the 11th October, 1822, presenting all the symptoms of gastro-intestinal irritation, with continued fever. He had successively four copious nasal hemorrhages, on the 7th, 14th, 21st, and 28th days, without any favourable result. The symptoms did not cease to increase in intensity up to the 30th day. From that period they diminished gradually to the 60th day; convalescence was merely interrupted by some temporary relapses of the inflammation of the intestines. The cure appeared complete, and the patient now complained of nothing but general debility, the result of his treatment, when one night, having gone out of bed, and walked a few steps (in February), he felt, on a sudden, a marked numbness in the lower extremities, which bent under him, and he fell. He was scarcely

* Ollivier, tom. ii. p. 452.

conveyed to his bed, when he threw up several times a considerable quantity of very liquid yellowish bile; the skin was hot and pulse frequent; no disturbance of the intellectual faculties; the patient could not sleep.

The following day his state nearly the same; paraplegia incomplete; continual formication of the skin, with somewhat impaired sensibility. This numbness did not ascend higher than the epigastrium. An acute pain existed along the spine as far as the middle of the dorsal region; motion increased it: upper extremities completely free (ammoniacal frictions along the site of the dorsal pain, blister to the loins). He continued in the same state till the fourth day, when the pains of the back increased, they extended as far as the neck, and the two upper extremities were weaker and benumbed. The patient could not grasp anything firmly in his hands; skin hot and dry; pulse frequent. A blister was applied to the nape of the neck. The fifth day, the numbness of the upper extremities increased a little, as also the dorsal pains. Ever since the third day a small eschar had come upon the sacrum, as broad as a quarter of a dollar, which had not taken place during the entire illness, though it had been very long, and he had constantly lain on his back, and his body was very much wasted.

The sixth day, all the symptoms began to diminish in intensity, and on the 4th of March he left the hospital, having recovered his strength and flesh, and no longer feeling any annoyance, except a little weakness in the lower extremities, which has since completely disappeared.

It is not very probable, that the phenomena presented by this patient were the result of a very active spinal congestion, for we see here none of the symptoms characterising meningitis? On the other hand, if we consider the multiplied connexions of the spinal marrow with the internal viscera, we shall be less surprised to see an affection of this nervous centre after an acute and long-continued gastro-intestinal irritation. This secondary affection was, in some degree, confirmed by the rapid formation of the eschar on the sacrum; a phenomena which was not observed up to that period, and which is generally common in the alterations of the spinal marrow or its membranes. It is probable that the accumulation of blood would have been less, if there had been applied a great number of leeches, or the cupping-glass, along the spine, instead of the irritating means which had been employed. Was there, at the same time, an increase in the serous exhalation, and a progressive absorption of the liquid? This supposition is not without foundation.

I have already remarked what influence the respiration exercised over the venous circulation of the spine. It is easy then to conceive that if in a person disposed to such congestions as these, there should supervene any serious alteration of the respiratory organs, the symptoms may become intense; the sanguineous congestion increases more and more; it also contributes to increase the difficulty of respiration caused by the pulmonary affection, and the patient dies

in a state resembling asphyxia. I examined the body of an individual who had been affected with incomplete paralysis in the movement of the trunk and extremities, with morbid exaltation of the cutaneous sensibility. This paralysis, which in its course had followed the progress I have marked out, had gradually diminished, and was nearly gone, when it again appeared simultaneously with a pleuro-pneumonia. This latter disease made rather rapid progress, and the paralysis was observed to go on increasing till his death; so that a few days before he died the patient had relapsed into the same state of paralysis, with extreme sensibility of the integuments. The upper and lower extremities performed but very feeble and general movements; respiration was extremely painful, and the movements of the chest were almost imperceptible. He preserved to the last the free use of his intellect.

At the *post-mortem*, we found rather extensive pneumonia and pleuritis of the right side: there existed at the same time considerable sanguineous congestion in all the meningo-spinal veins, which were manifestly dilated. The nervous cords were enveloped in a collection of veins very much gorged with blood, which evidently compressed each spinal nerve at its exit from the spine, a circumstance which perfectly explained the phenomena observed during life. There was a little serum effused. The spinal marrow and its membranes presented no other trace of alteration, no more than the brain and its membranes.

This sanguineous congestion of the spinal venous system was so much the more remarkable, as in another patient whom I opened soon after, and who had died of encephalitis, accompanied by a spinal meningitis, which was characterised by a puriform exudation between the pia mater and arachnoid of the spine, the spinal veins did not present a similar engorgement, and yet the afflux of the fluids which must have existed during the inflammatory process, could not but cause a congestion similar to that which we have just been examining. It appears evident that it alone sufficed to produce the general stupor with which the trunk and extremities had been struck, for the accumulation of fluid was not sufficiently abundant to warrant us in attributing to it the phenomena observed during life. They depended then slowly on the vascular congestion, and in a great measure on that which compressed the nerves at their exit from the intervertebral foramina.

Case* 57.—Abuse of venery—Incomplete paralysis of motion of the upper and lower extremities, without lesion of the sensibility—Slight pains in the loins—Absence of cerebral symptoms—Gradual disappearance of the paralysis from above downwards—Cure at the end of three months.

M * * *, thirty-eight years of age, of a sanguine temperament and lively disposition, had always led, up to the day of his illness, an active and laborious life. He indulged in spirituous drink, and venereal pleasures in the erect posture. The debility gradually produced

* Tom. vii., p. 464.

by this indulgenee obliged him to put some restraint on himself. After an act of this kind, he experieneed a pain in the loins, and a trembling of the lower extremities.

For the last two months, there was a general debility of the legs and wandering pains, which did not, however, prevent him from following the same kind of life; when on the 15th of April, after a violent fit of anger, he felt an almost universal trembling of the muscles. The 16th, after more labour than usual, numbness in the right hand. The 17th he travelled some miles on horseback (the numbness still continuing), on whieh oeeasion he drank some spirituous liquors; pains in the loins; a sensation of breaking of all the limbs. On the 18th the family physician observed a difficulty in his movements, some unsteadiness in his walk; he felt acute pains in all the articulations, a sense of formieation in the hands, no alteration of the features, no headache, respiration natural. 19th, faee flushed, slight pain of head, same state of extremities, pulse hard and aeeelerated (Bleeding from the arm, baths, diluent drinks).

After some days, MM. Dutrochet and Gendron were called into consultation, and found the patient sitting in a chair in the following state: — Upper extremities inert, hanging over the thighs, sensible to the touch; fingers move impereeptibly; to raise the shoulder and earry the hand to the forehead, the forearm slowly describes an arc of a eirele in its direetion toward the ehest, and the head inelines in order to meet the hand, which seareely touehes the cervical region; the left less capable of performing this movement than the right; both these limbs fall again by their own weight. The patient cannot grasp anything in his hands. He raises the legs from six to eight inches from the ground, and they soon fall again; toes immoveable; no pains in the extremities; merely a general numbness; and it is only after trying to perform some movement that he experiences a sense of formication. The movements of the muscles of the head and neck intaet; those of the back and loins abolished, so that the patient cannot rest on his seat; the posterior part of the trunk, all across the spine, not affected with any pain; a slight sensation of heat only in the dorsal region (twenty leeches applied at this part); skin in the natural state, pulse slow, tongue free from redness; respiration free; pulsation of the heart conformable to the pulse; some slight colicky pains in the abdomen; constipation; function of the bladder well performed; urine a little red.

An antiphlogistic treatment was prescribed without any other effect than that of reducing the frequency of the pulse. After the application of the leeches, the patient was deprived suddenly of the little motion which had existed up to that time. The idea that an effusion might be the cause of this occurrence, made the medical attendants apply blisters along the spine, and have recourse to the internal use of tonics. By degrees the pulse returned to eighty.

After this treatment was followed up for fifteen days, the power of motion sensibly returned; four blisters had been applied in succession. The patient objected to the application of any more of them. Obstinate constipation existed from the commeneement of

the disease; this was remedied by purgative enemata. M. Bretonneau, who had been called in, ascertained instantly the existence of an almost complete muscular paralysis, with preservation of the sensibility. He recommended the use of moxas, but the patient refused. Nux vomica, given in gradually increased doses as far as thirty-six grains a day, merely produced formication in the extremities, and slight agitation for some nights. The patient complained occasionally of acute pains in the heels; at last, annoyed at seeing no change in his state, he determined on taking no more medicine; only some dry frictions were occasionally made on the spine and extremities; by degrees the movements of the upper extremities became more sensible; the patient was able to use his hands in eating; but his legs could not support him; he could rise and keep a sitting posture without being fatigued; but when he wished to walk he could with difficulty proceed three steps, and that in a very embarrassed manner by the help of crutches. After about three months' illness his health was restored, and the paralysis entirely disappeared.

It would be difficult to admit, from the group of symptoms observed in this patient, that the cause of the paralysis consisted in an inflammation of the spinal marrow and its membranes. With the exception of the pain in the lumbar region, where no doubt the sanguineous congestion at the time of coition more particularly occurred, no phenomenon is observed which could well be connected with a well marked irritation. Everything, on the contrary, announces a cause which secondarily produced the torpor, and not the excitation of the spinal nervous centre, and this cause seems to me to have consisted in a sanguineous congestion, the frequent recurrences of which influenced the exhalation of the vertebral liquid, whose quantity progressively increased; however, the numbness which appeared in the right upper extremity after violent efforts, and when the weakness of the lower extremities had already manifested itself, might seem to prove that the afflux of blood did not take place in a uniform manner in all the points of the spinal vascular system. It is very probable also, that the position in which this man habitually indulged in coition, and the general contraction of the muscles which must result from it, could not but favour the spinal congestion.

We should also remark the extraordinary weakness of the circulation after the use of an antiphlogistic treatment, a circumstance which equally tends to prove that there was not there an active concentration of the fluids as in inflammation. Perhaps also the enervating action of the venereal excesses had weakened the influence which the spinal marrow exerts over the circulating apparatus, and this cause may have added to the effects of the compression made on the nervous centre. Was it from this same circumstance, or rather because the seat of the alteration was not in the tissue itself of the cord, that the nux vomica did not produce any result?

But how can paralysis of motion take place without an alteration of sensibility, admitting these phenomena to be the result of a

greater or less sanguineous congestion, and of the accumulation of a greater quantity of liquid in the vertebral canal. If we duly consider this morbid phenomenon, we shall find it hard to conceive that motion or sensation may be then separately abolished, since the spinal marrow should be equally compressed in all the points of its surface. Yet when we reflect on its position in the spinal canal, we see at once that its anterior part is kept almost immediately applied against the posterior surface of the bodies of the vertebræ by the spinal roots, whilst the posterior portion is removed five or six lines from the corresponding surface of the canal. The result of this arrangement is, that if a fluid interposes itself around the spinal marrow, it exerts stronger compression on its anterior part in consequence of being kept in closer approximation to the resisting part of its canal. On the other hand, if there be at the same time a congestion in the vessels of the pia mater which traverse the surface of the marrow, the effect of dilatation by these vessels, actin entirely on the anterior surface of the nervous cord, which can allow between it and the spine but a small interval, the anterior fasciculi are more particularly compressed; thence it is that motion is more particularly affected by paralysis.

I know that this explanation, rational though it may appear, would require to be supported by the results of examination of the dead body; but it is difficult for such phenomena, which can exist only under the influence of life, to continue after death. This remark is especially applicable to the numerous lesions of the nervous system, and it is with good reason M. Lallemand* has said, "that the pathological changes of the brain, the spinal marrow, and of their membranes, are more difficult to be appreciated than those of other organs, because that independently of the particular precautions which their examination requires, a violent inflammation, by producing death rapidly, leaves in them less evident traces; because a slight inflammation may more easily produce serious symptoms; because that, being the termination of all the sensations, this nervous centre is more susceptible than any other of being sympathetically irritated, and it is to this difficulty of finding after death the traces of those affections which were seated there during life that we must principally attribute the backward state of our knowledge regarding these diseases." The following fact, communicated by M. Dance, will prove the justice of M. Lallemand's observations: —

Case 58.† — Labour natural—Suppression of the lochia on the third day—Convalescence without any return of the discharge. At the end of a month formication in the hand and foot of the left side, then of the right side—An almost sudden paralysis of the motions of the four extremities—Preservation of the sensibility—No lesion of the intellectual functions—Increasing dyspnœa—death by asphyxia the second day—Congestion, though but little marked, of the spinal vessels—Brain and spinal marrow sound.

A woman, thirty-one years of age, a servant, of a strong constitution, was conveyed on the 2d of April, 1825, to the *Hôtel Dieu*

* Letter I, sur 'Encephale.

† Vol. ii. p. 471.

in a state of general paralysis; intellect not disturbed. She had lain in a month before: pregnancy and labour very favourable. The third day the milk fever set in, breasts swelled considerably, lochia entirely suppressed, and did not reappear. This did not seem to influence her health: she left the *Maternité* on the 12th day. At the end of eight days she resumed her duties as a servant; when, on the 1st of April, after having been apparently in good health up to that period, she felt suddenly a sense of creeping, at first at the end of the fingers of the right hand, then at the extremity of the toes of the same side, and half an hour after the same formication, first at the ends of the fingers of the right hand, then the right toes.

Notwithstanding this disagreeable sensation, she continued to walk about till three o'clock in the afternoon, when she was obliged to sit down, her limbs being no longer able to support her. She remained in this state, sitting in a chair, till seven o'clock, and her fatigue increasing, she was unable to gain the bed, and it was necessary to carry her to it. She had some sleep in the night; formication still annoying her. On the 2d, her state was as follows: lies on her back, face somewhat flushed; countenance not expressive of suffering; intellect perfect; not subject to headaches; had a slight one the evening before; formication at the ends of the fingers and toes; unable to raise her limbs, which, when raised, fall back on the back; this paralysis more complete on the left than the right. The limbs not rigid, but flexible; feet colder than the rest of the body; patient feels this.

Sensibility not diminished in any part of the body; the slightest contact of any body with the limbs is perceived; fingers half-flexed, and she is unable to extend them. Respiration performed with a sort of effort; evidently cannot dilate her chest sufficiently, which resounds in every part on percussion; but auscultation detects a slight rattle; a gurgling in the bronchi, evidently produced by the mucus collected in it, and which the patient is unable to expectorate, the movements necessary thereto being impossible. (Up to this period her cough had been always easy.) Tongue moist and pale; slight colicky pains for the last hour; no alvine dejection since the commencement of the attack; she passed urine, however, voluntarily during the day. Temperature of skin natural; pulse rather weak and slow than otherwise; has no appetite; no other uneasiness any where except the sense of formication. No pain along the spine, the conformation of which is regular, and on which there is no pain felt on pressure; movements of the head on the neck free. (Bleeding from the arm.) At the end of an hour respiration more difficult; chest dilates but imperfectly; bronchial gurgling more marked. At eight o'clock in the evening dyspnœa increased; marked contractions of the scaleni muscles at each inspiration; expectoration still impossible. (Sinapisms to the feet.) At ten o'clock suffocation somewhat less; efforts to cough still incomplete. No sleep that night. The following morning, the 3d of March, the paralysis increased in the right hand; sensibility retained; formication still con-

fined to the fingers and toes; lancinating pain occasionally in the heel and big toes of the right side; respiration a little more free; disappearance of the mucous gurgling, and of the ineffectual effort at coughing observed the preceding day; passes urine voluntarily; constipation continues; face less flushed, and is covered with blackish veins, particularly at the lips and cheeks; temperature of skin the same; pulse quicker and stronger, but regular, being one hundred; deglutition more difficult. In the evening the difficulty of the respirations still more increased; inspirations short and painful; face violet colour; skin covered with sweat; pulse 120 to 130; beating of the heart strong and tumultuous. At eight o'clock at night she was again bled; dyspnœa increasing, cold and general sweats; patient complains only of suffocation. At nine o'clock the circulation became slower, pulse insensible, and the patient expired at a quarter past nine.

Post-mortem. — Cavities of the cranium and spine were opened with the utmost care; marked engorgement of the vessels external to the cerebral dura mater, and of those coming from the diploe, particularly along the sutures, which gave to this membrane a violet tint. Nothing remarkable in the brain, except that on the surface of each section of it there were some red points, indicating a slight engorgement of this viscus.

In the spine the cellular tissue external to the spinal dura mater was slightly infiltrated with blood, particularly in the lower region. Spinal marrow, minutely examined, presented nothing unusual; its consistence rather increased. Lungs natural. The cavity of the uterus lined with a reddish mucus.

The different circumstances of this interesting case cease to present so much singularity, if considered with the preceding and the following cases. We shall see that sanguineous congestions of the spinal medulla in women, are more frequently caused by the suppression of a customary evacuation, and it is so much the more probable that in this case the sudden suspension of the lochia was the primary though remote cause of all the symptoms so rapidly followed by death; since M. Dance assured me, that he has frequently observed, at the *Hôtel Dieu*, the same phenomena in lying-in-women, after such a suppression, or that of the milk, or the cutaneous transpiration, &c. Let us now add a remark, which may explain the sudden invasion of the paralysis: it is this, that it was precisely a month after the suppression of the lochia that the first symptoms were observed to come on, a time when the periodical movement must exist, under whose influence the menses usually reappeared, a coincidence which may account for the rapidity of the spinal congestion.

But, it will be said, this concentration of blood in the spinal vascular system was not accompanied with any dorsal pain, and the progress of the paralysis, which commenced in the left hand, then attacked the left foot, and from thence extended to the same parts of the opposite side, is no longer analogous to that, the symptoms of which have been already described by me. These differences

do exist, I admit; but was not this rapid accumulation of the fluids announced by the state of the pulse, which ceased to be depressed as soon as ever the bleeding diminished the first symptoms of suffocation, and which became rapid and frequent at the same time that the phenomena of active congestion in the spinal vessels increased in intensity? This violent fever could not be the result of the alteration of any organ, as they were all sound. With respect to the extraordinary progress of the paralysis, it does not prove that this symptom did not depend on a simple vascular congestion; for it is quite sufficient to consider for a moment the spinal circulation in general, in order to see that it may be the seat of partial congestions, more or less circumscribed, before the sanguineous congestion becomes general. Thus we may explain the numbness of one limb separate, then of another, &c.

It cannot be admitted that the paralysis was produced in this patient by the cerebral congestion, which was very slight, as may be inferred from the state of the intellectual faculties, which remained sound up to the last moment. In fine, the increasing dyspnœa, caused at first by the restraint in the functions of the spinal cord, became in its turn one of the causes which concurred in embarrassing still more the action of this nervous centre. Here an objection may be raised, and apparently a very strong one, against the different explanations I am giving; it is, that there were found on the dead body but slight traces of the sanguineous congestion to which I attribute all the symptoms which presented themselves. No doubt these traces were slight; but is it astonishing that a sanguineous congestion so rapid, and which caused death in so short a space of time, did not leave behind it more vestiges of its existence? Ought we to be surprised that a phenomenon, merely vital, should disappear with the cessation of vitality? However, the sanguineous infiltration of the cellular tissue external to the dura mater, combined with the symptoms presented by the patient, sufficiently attests it. The results of the autopsy above recorded could not be objected to this opinion; for, in this case, the patient had been affected for a long time with paralysis of motion in the trunk and limbs, and the repeated sanguineous congestions had insensibly dilated the spinal vessels, which contributed to favour the stagnation of the blood after the individual died. Here, on the contrary, the invasion of the paralysis was sudden, and its duration very short: besides, death having been the result of a real asphyxia, the blood remained liquid, a circumstance which must again have contributed to facilitate its return towards the central parts of the circulatory apparatus in the last struggle.

The influence of the venous circulation on the spinal marrow has been noticed by P. Frank,* who has made very just and well founded reflections on this subject. The considerable quantity of blood found frequently in the veins and sinuses of the spine, the

* Delect. Opuscul., tom. xi.; de Vert. Colum., &c., an. 1792.

distribution of these vessels in which the blood circulates against its own gravity, and without being aided by the action of valves, whilst its course is free and easy in the thorax and abdomen, are so many circumstances which fixed his attention. Is it, then, astonishing, he says, that the suppression of an habitual flux, as the menses or hemorrhoids, is so often accompanied with dorsal and lumbar pains more or less severe, and that we observe the same phenomenon towards the latter period of pregnancy, in certain chronic affections of the abdomen, in inflammation of the uterus, in its prolapsus, eversion, or in scirrhus of the same organ, and in certain spasmodic colics? Is it not, again, to the congestion and distension of the vertebral sinuses and the vertebral veins that we must attribute certain pains of the back and lower extremities, certain sciatic neuralgiæ, certain species of lameness, divers tremors and convulsive movements, stupor or paralysis of these extremities, as well as several epileptic and tetanic phenomena?

Such is the cause of those incomplete and transient paralyses, which appear in some persons affected with bleeding hemorrhoids, a little before their appearance, and noticed by Hippocrates.* Aretæus† observed the same phenomena after the suppression of a periodical hematuria. F. Hoffman‡ saw the same thing after parturition. Van Swieten§ has remarked that vomiting produced similar effects. Frank saw a paralysis of both arms come on after a violent movement, and go off spontaneously after some hours. Spinal sanguineous congestions also take place, according to this last author, at the time of the cold stage of fever, or consecutively to an acute irritation of the intestines, considerable engorgement of the viscera, a contraction of the aorta, or after an aneurism of this vessel; they are then sometimes accompanied by pain in the dorsal and lumbar regions. I am almost certain, adds Frank, that the effects of respiration on the spinal marrow are the same as on the brain, and that the vertebral veins and sinuses must experience the swelling, the same dilatation; whence it follows, that there exists in the spinal canal, as in the cranium, a momentary plethora, when the lungs are under a more or less prolonged restraint in their action.

We see how just are the different reflections of Frank, and how entirely they accord with the preceding observations. This last remark, relative to the influence of respiration, is confirmed, by modern physiological experiments, and by numerous pathological facts. With regard to the spinal congestions produced at the time of the cold stage in fever, I doubt not but they are also the cause of several other phenomena commonly observed on the approach of fever, as the heat and pain of the back, the sensation of fatigue, the pains and transient numbness of the limbs, &c., phenomena which are so much the greater, if the sanguineous congestion exist at the same time in the tissue of the spinal marrow itself.

* Coac. Prænot., No. 346.
† De Morb. Diuturn., c. 3.
‡ Med. Rat. Syst., part iv. p. m. 41.
§ Comment., tom. iii., p. 266

J. Frank* has also made some remarks regarding the influence of sanguineous congestions on the spinal marrow and its functions. He shows that "the arterial and venous circulation of the spine and spinal marrow must undergo numerous modifications, in the case where there exist any chronic engorgements of the abdominal viscera, or when the uterus is distended by the product of conception, or when repeated exertions act on the respiration; on the one hand, because each intercostal and lumbar branch of the aorta sends into the vertebral canal a branch which anastomoses with the spinal arteries which are sometimes found dilated, and as it were aneurismatic;† on the other hand, as many veins of the vertebral canal open into the intercostals, which terminate through the vena azygos in the vena cava superior, it is easily conceived that all the changes in the lungs, or of the right cavities of the heart, which may cause any obstacle to the circulation, must produce in the spinal cavity a venous plethora. In this way may be explained the affections of the spinal marrow which supervene on a suppression of the menses, of an hemorrhoidal flux, or of any other habitual hemorrhage."

Ludwig,‡ a considerable time back, advanced ideas similar to those of P. and J. Frank; he thus expresses himself on this subject in the chapter entitled *Tractatus de Doloribus ad Spinam Dorsi;* "The very acute dorsal pains which so often exist in severe intestinal colics, depend on the affection of the lumbar portion of the spinal marrow, which happens through its communication with the nerves of the great sympathetic. This organ again is the seat of those pains which seem to ascend along the back in certain cases of hemorrhoids, in scirrhus and cancer of the rectum. The sensation of tension in the back and loins, complained of by females labouring under dysmenorrhœa, as also in certain cases of pregnancy, results also, according to the same author, from a similar irritation of the spinal marrow. In a word, he thinks (ibid., p. 730) that at the onset of fevers, the wandering pains in the limbs, and in the dorsal region, depend on the impeded circulation of the blood in the vessels of the pia mater, brain, and spinal marrow.

These different quotations are sufficient to prove that the attention of observers has been already fixed on the phenomena which result more or less directly from spinal sanguineous congestions, and on the causes which may concur in producing those congestions.

I have already remarked that the most ordinary effect of venous congestions in general is to produce, as the retardation or suspension of the course of the blood in the veins of a part, a dropsy more or less circumscribed, according as the obstacle acts on one or more points of the venous circulation. This pathological phenomenon, of which numerous instances are found in the valuable work of Morgagni, and which the still more recent observations of M. Bouillaud

* Praxeos Med. Univ. Præcept. tom. vi. p. 26. Torino, 1822.
† Malacarne, Encefalotomia Nuova Univ. Torino, 1780.
‡ Advers. Med. Prac., tom. i. p. 711. Leipsic, 1770.

have further confirmed, would of itself suffice, if cases and observations did not prove it, to demonstrate, that when, by any cause whatever, the spinal venous blood is retarded in its course, or this portion of the vascular system becomes the centre of an active but moderate and frequently repeated fluxion, the quantity of the vertebral liquid increases, and must produce a greater or less compression on the spinal marrow.

I have accordingly often observed, with a well marked sanguineous congestion in the veins of the spinal marrow and its membranes, a greater quantity of serum in the cavity of the latter. Several times have I found considerable spinal effusions in old men who died after an attack of apoplexy; in some the serum was bloody, which resulted from the escape of a portion of the blood which had been effused into the cranial cavity. The spinal serous collection, which is situated between the pia mater and the inner reflexion of the arachnoid, is always sufficiently abundant in the dead body, since it distends the whole meningeal sheath during life. The presence of an abundant liquid, which usually fills all the space between the spinal marrow and its membranes, was observed and described long since by Cotunnius,* the accuracy of whose observations (which, by the way, appeared to have been forgotten) was confirmed by the curious and recent researches of Magendie, who was the first to remark, that this liquid is truly sub-arachnoid, that is, that it is contained between the pia mater and the internal reflexion of the arachnoid. With respect to the communication of this liquid with that of the brain, it takes place by a small aperture described by this eminent physiologist,† and which is situated on a level with the termination of the fourth ventricle. It is through it that the liquid may flow from the cerebral ventricles into the spinal canal, and reciprocally from the canal into the ventricles.

I thought it right to insist here, on all the peculiarities relative to the vertebral liquid, as well to establish its constant presence as its quantity. It is then evident, from the observations of Cotunnius and Magendie, and from those which I have made several times on the dead body, that in the normal state the spinal marrow is surrounded by a copious fluid, which distends the spinal membranes. Now, it is easy to conceive, that a slight increase in the quantity of this liquid, or that a vascular congestion to any amount may be sufficient to produce, on the spinal nervous cord, a compression, which instantly produces a numbness, then an incomplete paralysis of the extremities. Besides, do we not know, that a slight cause is sufficient to disturb the functions of so delicate an organ, and with which all the nerves of sensation and motion communicate? Thus, then, the presence of this liquid, necessary to the performance of the functions of the spinal marrow, as is proved by the results of its removal, at the same time renders this organ more susceptible of

* De Ischiade Nervosâ Comment., in Sandifort, Thesaur. Dissert., tom. ii. p. 411, et seq. 1764.

† Journal de Phys. Exp. Jan. 1826.

feeling the influence of the slightest pressure. The rapidity with which it is reproduced, evidently proves its importance. That this fluid fills the entire spinal canal during life, has also been proved beyond a doubt; and hence the difficulty of appreciating, in the dead body, whether the quantity of serum found is the result of dropsy, or of the normal state. In general, irritation of the spinal meninges, whether immediate or consecutive to an alteration of the bones, contributes equally to increase this exhalation.* On the other hand, there have been occasionally observed, during life, phenomena which announced a greater or less irritation of the marrow and its membranes, in persons whose vertebral canal, being opened after death, seemed to contain a quantity of serum more abundant than natural.†

The free communication of the cranial with the vertebral liquid, very well explains how spinal dropsy may supervene after birth consecutively to a hydrocephalus. Morgagni gives a very remarkable case of this, recorded by Genga.‡ Morgagni reports several cases of serous apoplexy with effusion into the spinal canal, which effusion he considers to have begun in the cranial cavity. Still, it also happens that hydrocephalus and serous effusion of the cranium do not give rise to a more abundant quantity of serum in the canal of the spine; as I have proved frequently in dissecting children who died of hydrocephalus. This phenomenon, apparently contradictory to what has been previously stated, may be readily understood by observing what takes place sometimes in cerebral dropsy. The liquid, in dilating the cerebral ventricles, makes, posteriorly, on the aqueduct of Sylvius, a pressure sufficient to close up this canal. Henceforward then, no more liquid can flow into the vertebral canal. This takes place principally in the case where the fluid pushes back posteriorly the blind canal formed by the pia mater, which Bichat described as a canal of the arachnoid.

If we may judge from what has been now stated of the difficulty of finding, on the dead body, traces of certain sanguineous congestions of the marrow and its membranes which have existed during life, we also see that it is most frequently impossible to appreciate whether the quantity of this liquid is really increased so as to constitute a real hydrorachis, or spinal dropsy, since the membranous canal of the spinal marrow is entirely filled with serum during life, and the accumulation of it is more considerable in old age, in consequence of the atrophy of the nervous centres, and a slight increase in its quantity is thus sufficient to produce stupor or numbness of the trunk and extremities. Be that as it may, it appears to me certain, that venous congestions and serous effusion, whether existing separately or simultaneously, are, under certain circumstances, the real cause of nervous affections, independent of any morbid change in the tissue of the spinal marrow, of its nerves, or

* See Morgagni de Sed. et Caus., Epist. x. sect. 13.
† See Bonnet. Sepulchr. tom. i. p. 305.
‡ De Sed. et Caus., epist. xii. sect. 9.

its membranes. Spinal meningitis may, no doubt, give rise to a more copious exhalation of serum, but there is then observed a regular train of specific symptoms; and though this inflammation may be, in some measure, nothing but the same phenomenon differing only in the rapidity of its progress, I thought it right to examine it separately.

Case 62. — A soldier, of an infantry regiment of the line, twenty-six years of age, received a thrust of a foil in the left temporal region, and instantly fell. When brought to the hospital he was in a profound stupor. Respiration difficult and slow; at each expiration a frothy saliva escaped from his mouth; convulsive movements agitated his limbs. He was bled without any effect. Respiration became slower, and he died three hours after the accident.

Post-mortem. — A rounded and even perforation, about the size of a line and half in every direction, at the inferior and anterior angle of the left parietal bone, directly in the furrow which lodges the meningeal artery. Effusion of black blood, a little coagulated, over the entire surface of the lobes of the brain, as also at the base of the skull, where it was more abundant. The sinuses of the dura mater were filled with black blood. The foil, in entering the furrow of the parietal bone, had pierced the meningeal vein, without at all touching the meningeal artery. The substance of the brain was not perceptibly injected; the instrument had penetrated about an inch into the cerebral substance. It was not observed that it entered the ventricle of this side, the cavity of which, as also that of the left ventricle, were, however, filled with fluid black blood.

Spine. — On allowing the neck of the body to hang over the edge of the table, after removing the brain, I remarked that there flowed from the spinal canal a great quantity of black blood, very fluid, and still warm. After opening the spine I found the cavity of the spinal membranes still filled with this fluid, though a great abundance of it had escaped from it before opening it. A frothy red blood raised the inner reflexion of the arachnoid, which was united but loosely to the pia mater by cellular bands. The medullary portion of the medulla oblongata was white, without any perceptible injection, and of ordinary consistence.

It would be wrong, no doubt, to draw from this case any arguments to illustrate the symptomatology of sanguineous effusion into the spinal membranes, because the wound of the brain, and the accumulation of blood into the ventricles, and at the surface of this organ, must have contributed to produce the symptoms which preceded death. However, I am inclined to think, from the recent experiments of Magendie, that the blood which flowed into the spinal sheath may have concurred in determining the general convulsions observed. It was effused, as has been seen, partly between the pia mater and arachnoid, and partly into the very cavity of this latter membrane, a circumstance which is explained naturally by

the nature of the wound. May not this fluid, differing from that which naturally fills the membranous canal of the spine, have acted as an irritating body on the spinal marrow and its nerves? thence the convulsive movements of the limbs.

Case 64.*—Spontaneous hemorrhage and rupture of the cephalic bulb of the spinal marrow and of the annular protuberance—Convulsive contractions of the limbs—Stertorous respiration—Death at the end of five hours.

M. D., a middle-sized man, large head, short neck, broad shoulders, and large abdomen, very muscular, being at work in the open air, complained suddenly of a ringing in the years; some minutes after he screamed from acute pain; he arose, commenced to run, as if to escape the danger which threatened him. After having run for a short distance, he fell, and presented the following symptoms:

Complete loss of consciousness; face pale: immobility of the pupil, which is not dilated, and is of the same diameter on both sides; eyelids at first half closed, and completely approximated (the upper lid of the right side fell a little subsequently to the left); immobility of the globe of the eye; mouth half open; tongue covered with arterial blood, and occasionally protruded, but without permanent deviation of its point; lips covered with frothy saliva; no perceptible tension of the mouth.

Respiratory movements frequent, irregular, accompanied occasionally with *stertor*, and almost continually with a sound similar to that which is frequent in attacks of epilepsy. The alæ nasi contract convulsively with the muscles of respiration. Twice there was violent sneezing, during which the patient, who lay on his back, bent forward. The limbs in a state of rigidity, which is easily overcome. This contraction, besides, is not entirely permanent; it ceases for some moments, and then the limbs are pliant enough, particularly the arm of the right side; the contraction then manifested itself suddenly, and lasted some time. In a word, these contractions seemed to hold a medium between tonic and clonic convulsions, though they approach nearer to the latter. The contraction of the muscles of the neck was not strong enough to prevent the head, in obedience to the laws of gravity, from inclining to the right or to the left, forwards or backwards, according to the position given to the patient. With respect to the sensibility, it was hard to determine whether it was abolished or not. There was observed a convulsive movement of the right arm when its skin was pinched, and a similar movement when the integuments were cut in bleeding him. Were these movements owing to the pain experienced by the patient? Some contractions of the right arm during the bleeding manifestly increased the force and size of the stream of blood.

In considering the almost convulsive contractions of the limbs, during which the arms were rotated inwards, and the strongly flexed

* Ollivier, tom. ii. p. 511.

state of the thumbs, and the froth with which the mouth was covered, one would have thought it a fit of epilepsy; but the patient never presented any symptom of this disease. He died five hours after the first appearance of the disease. He had not been observed for the last two hours. On examining the body, the central protuberance was found changed into a pouch filled with blood, partly coagulated, and mixed with some fragments of nervous substance, softened and coloured by this liquid. This effusion made its way laterally by a small opening; but the principal rupture existed in the fourth ventricle, the floor of which, divided transversely, had given issue to the blood which distended the parietes of this ventricle.

It is to be regretted that this patient was not watched closely up to the time he died, because the general paralysis which must have preceded it might have been ascertained. It cannot be doubted but that this spontaneous hemorrhage produced the cessation of motion and sensibility, when it occasioned the laceration of the entire substance of the spinal bulb. But if this case be incomplete in this respect, it is still very important, in its establishing the diagnosis of the effusion from its commencement in the portion of the cerebro-spinal system. These symptoms are truly characteristic, and present no analogy to those which are peculiar to other cerebral hemorrhages. I have since had several opportunities of observing this apoplexy at the moment of the attack, and I have always remarked convulsive contractions in the upper extremities, with alternating movements of rotation inwards. The opening of the mouth underwent no change. These spasmodic convulsions, observed at the commencement of the attacks of apoplexy in general, seem to me to depend on the irritation which the blood produces on the extremities of the torn medullary fibres, with which it remains in contact, and on which it must act as an irritant.

With respect to the general paralysis of the upper and lower extremities, it has been uniformly observed, in all cases where, at the *post-mortem*, there has been found an apoplectic cavity in the substance of the protuberance and peduncles. M. Serres* saw several instances of this hemorrhage; and always, he says, complete immobility of the trunk and upper and lower extremities took place at the same moment when the apoplectic attack showed itself. Thus I hesitate not to assert, that paralysis existed during the last hours before the death of the person who is the subject of the preceding case.

In the first moments we saw that the respiratory movements were executed freely enough, and were even voluntary, since the patient sneezed twice, in doing which he flexed the trunk forward, and we know that this movement of respiration requires an effort of expulsion, which is impossible when the action of the respiratory nerves is abolished. It is probable that the hemorrhage, confined to the

* Annuaire des Hopitaux, p. 331, in 4to., 1819.

protuberance, and to some fibres of the corresponding portion of the peduncles, did but lacerate them progressively, whilst it extended itself towards the cephalic bulb, a point where the rupture was soon followed by death. The manifest movements made by the patient, when pinched, and when his skin was cut in venesection, show that, at the commencement, the sensibility was not extinguished; and this circumstance is precisely conformable to the seat of the hemorrhage, which at first occupied, as we have seen, only the anterior fasciculi of the spinal marrow.

Death is so much the more rapid, according as the hemorrhage is more abundant, and the more it involves the cephalic bulb of the spinal marrow. The respiration becomes more difficult, and stertorous also; it becomes progressively retarded, and the patient dies of real asphyxia; sometimes, too, the lungs are found emphysematous. M. Serres quotes two facts which prove that life may still continue a long time, notwithstanding the paralysis of the upper and lower extremities, consecutive on hemorrhage of the protuberance. He met in two subjects, even in the midst of the *pons Variolii*, a cavity containing a yellowish fluid: there was an induration of the surrounding cerebral substance. The numerous excoriations on the posterior parts of the body in both subjects, evident marks of long-continued lying on those parts, the atrophy of the upper and lower extremities, equal on both sides, were evident proofs of a paralysis of long standing, consecutive on the effusion into the protuberance, which was partly absorbed.*

It is then particularly when the hemorrhage interrupts the continuity of the fibres of the peduncles, that effusion at the protuberance gives rise to paralysis of the four extremities. But if the hemorrhage be inconsiderable, and the apoplectic cavity very much circumscribed and situated in the median line, the fibres of the anterior cords are but little altered, the general paralysis but little marked, and the individuals may live a longer time.

The effusion which is seated in the annular protuberance, is situated therefore above the interlacement of the fibres of the pyramids; now if these fibres are completely divided only on one side, we observe exactly the same phenomena as those which result from the hemorrhage which takes place in the parts of the encephalon which preside over the movements of the leg and arm; in a word, hemiplegia supervenes. The following example will furnish the proof of this pathological fact: —

Case 65.†—Hemorrhage circumscribed to the left half of the protuberance, involving the fibres of the left peduncle—Hemiplegia of the right side—Death at the end of two days, after a cerebral congestion—Cancer of the heart.

Isidore Magriz, forty-six years old, entered the hospital Salpétrière for a *complete hemiplegia of the right side*, which existed for several years. There was nothing particular in her state until some

* Loc. cit., p. 355. † Olliv. p. 525.

time after, when she suddenly felt a dizziness with loss of consciousness. Face injected, pulse strong, &c.; in a word, all the symptoms of strong cerebral congestion manifested themselves. In spite of every means being resorted to, she died two days after the appearance of the first symptoms.

Post-mortem. — *Outward appearance.* — Countenance very much injected, and of a violet hue, as also the conjunctiva and eyelids, which were swollen.

Cranium. — Much black blood between the arachnoid and pia mater; the grey substance of the circumvolutions were of a deep colour; white substance injected, and presented some slight marbling; ventricles contained a considerable quantity of serum. On cutting the annular protuberance layer by layer, there were found in the midst of its left half evident traces of an effusion which had been absorbed: a circumscribed cavity, filled with a filamentous tissue infiltrated with yellowish serum, and capable of containing an ordinary sized kidney bean: its greater diameter, of about five lines, was situated almost transversely, and a little obliquely from within outwards. This cavity of an old effusion partly absorbed, evidently interrupted the continuity of a great part of the fibres of the left peduncle.

Thorax. — Lungs gorged with black, fluid blood; pleuræ contained several ounces of serum. The muscular fibres of the parietes of the right ventricle of the heart were evidently changed into a yellowish white, encephaloid tissue.

Abdomen. — Mucous membrane of the stomach thickened and of a brown red. Liver and spleen gorged with blood.

This case, interesting in more respects than one, proves then at once that the hemorrhage which takes place in a part of the annular protuberance, may produce the same results as that which takes place in the *optic thalami* and *corpora striata* of one side of the encephalon, and that similar effusions, when they are not very extensive, are capable of absorption, just as those of the brain. Nothing, indeed, can distinguish this hemorrhage from the cerebral apoplexy which gives rise to hemiplegia.

The paralysis which results from an effusion into the cerebral protuberance is always limited to motion, because the rupture involves only the anterior fasciculi of the spinal marrow. It is susceptible of cure, as well as that which depends on hemorrhage which takes place in the other parts of the encephalon, and this favourable termination is effected by the same mechanism. The case I have now detailed presents an example of the progressive absorption of the effused blood, and proves that the primitive effects of the effusion still continue when the continuity of the medullary fibres has been interfered with. I shall, on this subject, make one remark, which is equally applicable to cerebral hemorrhage; it is that paralysis may disappear in cases where the blood resulting from the hemorrhage is effused between the medullary fibres, which it only separates, and which it compresses without destroying them; whilst, if their rup-

ture takes place, the cure is never complete, and whatever means be employed, the effects still continue. I am certain that to this cause alone, already pointed out by M. Foville, and not to a cicatrisation of the torn medullary fibres, we should attribute the disappearance of the hemiplegia in certain individuals. It is easy to conceive, in fact, that the paralysis resulting from the compression made by the effused blood on the nervous fibres in separating them, will diminish according as this compression ceases in consequence of the absorption of the blood and the contracting of the apoplectic cavity. The hemorrhages which tear more or less rapidly the tissue of the spinal marrow, present then the same phenomena as those which burst into the lobes of the cerebrum and cerebellum. The alteration and the tissue being of the same nature, the effects must necessarily bear a resemblance: I do not refer to the symptoms, which differ in more than one respect in these different cases. An active and sudden congestion is followed by hemorrhage, by effusion of blood in variable quantity, and by a paralysis more or less prompt; but when the sanguineous congestion takes place less rapidly, when it is more continued, the nervous tissue undergoes an alteration intermediate between inflammation and hemorrhage properly so called; this continual afflux of fluids brings on by degrees the softening of the medullary substance; the blood infiltrates and unites itself with it in some measure, and if the congestion continues, the nervous tissue is changed into a reddish, diffluent, soft consistence, mixed sometimes with liquid and pure blood. In this case the paralysis develops itself but gradually, and this disorganisation of the spinal marrow, prepared in some measure by repeated and constant fluxions, may sometimes rapidly destroy this nervous centre to a considerable extent. — TRANSLATOR.

THIRD ORDER.

OBSERVATIONS ON SOFTENING OF THE CEREBRAL HEMISPHERES.

THE excellent works published in later times on softening of the brain by MM. Rostan, Lallemand, Bouillaud, and others, are far, in my opinion, from having exhausted this subject. Science as yet possesses but data oftentimes incomplete, either to establish with precision the nature of this affection, or even to assign it its real symptoms. I do not think, for instance, with M. Lallemand, that a sanguineous congestion always precedes softening of the brain; I think that there are some cases, where the first appreciable lesion consists even in the diminution of the consistence of the nervous pulp, and this diminution of consistence may constitute the only alteration. Instead of being reddened by blood, the part softened may have preserved its natural colour, or even present a remarkable

want of colour, without, in the latter case, any thing warranting us in thinking, as M. Lallemand had admitted, that pus infiltrated the nervous pulp thus divested of colour. Softening of the brain does not necessarily commence by an hyperemia; it is not necessarily complicated, during its course, even with sanguineous congestion; neither does it necessarily lead to suppuration; it exists as a lesion independent of any other lesion; it is not, uniformly, either the termination or commencement of any other, but many others may accidentally become complicated with it. In several cases, it is true, during its isolated existence, it is but one of the elements of inflammation of the brain; but because the irritation produced by the entrance of a ball into the brain, causes around this foreign body the formation of a softening, with sanguineous congestion, infiltration of pus, &c., is that, in sound logic, a reason for concluding that every softening should be considered as an inflammatory disease?

All that we can discover, in a very great number of cases, is a diminution in the consistence of the nervous pulp, its change into a sort of softened mass, its slow or quick return to this half-liquid state, which was its primitive state. With respect to the causes of this alteration, they often escape us. With respect to its nature, even that is not known to us; and if, in this state of ignorance, we go beyond what facts teach us, if we assert that every softening is an inflammation, a degree or form of that, which, in a language altogether arbitrary, we call an encephalitis, we do great injury to science. For, it is quite clear, that, the moment we shall have placed our reasoning in opposition to the facts, the latter will be no farther admitted by us, but as far as they shall confirm our hypothesis; and there will thenceforth be a stop to all further progress. I think then, with M. Rostan, that, until more is known on the subject, the term softening is preferable to any other to designate the alteration of the brain which we are now about to consider.

What shall I now say of the symptoms which have been assigned to softening of the brain? If we read the several works published on this subject, we shall be astonished to see how much the symptomatology varies in them all. Such a morbid phenomena, permanent flexion (*contracture*), for instance, which with one observer holds the first rank among the symptoms, is scarcely mentioned by another. It is the same with pain of head, disturbance of the intellect, &c. The first phenomena which mark the existence of cerebral softening, are equally far from being described identically by different authors. Some persons always distinguish readily by the difference of their commencement, a hemorrhage of the brain, and a softening of this organ. To others such a distinction is often impossible.

These differences of opinion are no doubt attributable to this, that each author has made his observations on subjects placed in conditions different in respect of age and constitution; whence there resulted, with regard to the symptoms, so many special forms of the disease. Each person, thus judging only from the data before

him, has been able to discover only one side of the facts, and thus he remained incomplete in their description. I have endeavoured to avoid this difficulty by proceeding in a different course. After having detailed a certain number of cases, calculated to point out the leading differences which may be presented by softening of the brain, with regard to its symptoms, its commencement, its duration, and its nature, I have endeavoured to attain the most complete description possible of this affection, by combining with the facts collected by myself those previously published by different authors.

SECTION I.

PARTICULAR CASES.

I HAVE ranged the cases in a certain number of groups, which are reduced to the following:

In the first group, I have placed some remarkable cases in which cerebral softening remained completely latent.

The second group includes cases in which the only functional disturbance on the part of the nervous centres was a lesion of motion, a lesion far from being always the same.

To a third group I attached some cases where the lesion of sensibility was the prevailing phenomenon.

To a fourth group I referred other cases, where, together with varied disturbances of motion and sensation, an alteration of intellect or of speech coincided.

Finally, in a fifth group, I have detailed cases where the only functional disturbance was loss of speech.

CHAPTER I.

CASES WHERE NO SYMPTOM ANNOUNCED THE SOFTENING.

CASE 1. — This was the case of an old man, eighty-one years of age, who had been for a long time deprived of all appetite for food: he sank gradually, and died in an adynamic state. At the autopsy there was found a softening at the base of the anterior lobe of the left hemisphere; around the softening, the cerebral substance gradually recovered its natural consistence, without being changed in colour. A broad eschar formed on the sacrum; a blackish tint of the villosities of the stomach and duodenum was the only lesion found in the digestive organs.

CASE 2. — This was the case of a man forty-five years of age, who laboured under a chronic affection of the stomach and liver.

He complained of pain in the right hypochondrium, where there was found a hard tumour, painful to the touch. Whilst in the hospital he had several times vomited an abundance of black matter; he died of exhaustion, but never had the least disturbance with respect to intellect, or the power of motion; and yet, at the *post-mortem*, there was found extensive softening of the cerebral hemispheres in several parts.

Case 3. — Softening of the posterior lobe of the left hemisphere, of the middle lobe, of the right lobe, and of the *fornix*. No symptom, however, indicated this. There were cancerous products in the pleuræ, mesentery, liver, pancreas, and one of the kidneys.

Case 4. — This was the case of a man, fifty-five years of age, who had been wounded in the head in the Russian campaign; at a vestige of this wound there was a perceptible depression, the size of a dollar, on the middle part of the left parietal bone, yet he complained of no headache; intellect entire; his senses and speech all perfect; he died in the hospital of phthisis. On the *post-mortem* the convolutions of the brain, corresponding to the site of the wound, were softened; the bone over this part had been completely destroyed, and nothing but a mere plate of cartilage was interposed between the hairy scalp and the brain; the arachnoid and pia mater were very much thickened in this part.

CHAPTER II.

CASES WHERE THE DISTURBANCE OF MOTION WAS THE ONLY SYMPTOM.

It has been stated, that in softening of the brain there was a period of the disease when the limbs presented the phenomenon of flexion in different degrees. We shall endeavour to show, in the following cases, that this symptom, though very frequent, is not constant, and that in its stead we may meet either simple paralysis, or other disturbances of motion; such as convulsions or tetanic rigidity. We shall commence with cases wherein the flexion (*contracture*) took place transiently or permanently.

Case 5. — This was the case of a woman, sixty-six years old, who entered the hospital with all the symptoms of diseased heart. After some days she found herself unable to move the extremities of the left side; her forearm also was strongly flexed on the arm, and the fingers so flexed that their ends touched the palm of the hand; no pain in the parts flexed; their sensibility perfect; intellect and speech natural; no headache. The third day from the appearance of the flexion of the forearm and fingers, her habitual dyspnœa increased, and she died in a state of asphyxia in the course of the night.

Post-mortem.— Cranium. — Several of the convolutions of the right hemisphere were transformed on their surface into a sort of reddish softened mass; in the substance also of this hemisphere, on a level with the *centrum ovale* of Vieussens, there were five or six points where the cerebral pulp was similarly softened.

Thorax. — Heart large; hypertrophy of its parietes and dilatation of its cavities.

Case 6.—Softening of a portion of the right hemisphere—No other symptoms but permanent contraction of the left upper extremity—Pulmonary tubercles.

A woman, seventy-eight years old, entered *La Pitié* in a state of marasmus; with excessive diarrhœa, and a cough of long standing. She answered questions perfectly well, but could not move at will either the upper or lower extremity of the left side. The forearm was flexed on the arm, and the hand formed an acute angle with the anterior surface of the forearm. The lower extremity, which was in a state of complete relaxation, presented no appearance of flexion. She stated that about a fortnight before coming to hospital she was astonished to see the ring finger and little finger of the left hand suddenly flexed, without her being able to extend them again. After a few days the entire left hand became flexed on the forearm, and the latter soon after on the arm; at the same time the lower extremity became numbed, heavier than the other, and at last completely paralysed, but exhibited no signs of flexion. The patient always retained her consciousness, never had any pain of head, nor of any part of the body. She had pulmonary phthisis; at the summit of the right lung was an immense cavity. After remaining in the hospital about twenty days, she sank gradually, without exhibiting any new phenomenon in the nervous system.

Post-mortem. — A little below the convolutions, at the junction of the anterior and middle lobes of the right hemisphere, the nervous substance was manifestly softened; no injection accompanied this softening; the portion of brain softened resembled in colour and consistence a strong solution of starch in water.

Remarks. — In this case flexion (*contracture*) was the only phenomenon caused by the softening. It was at first but partial, being limited to two fingers; it then gradually increased, without, however, extending to the lower extremity, which presented nothing but simple paralysis.

Case 7.—Softening affecting at the same time the optic thalamus and corpus striatum of one side—Flexion at the commencement, then resolution of the limbs—No other cerebral symptom—Aneurism of the aorta.

A man, fifty-three years of age, had been for a long time subject to rheumatic pains in different articulations. Two years before entering the hospital, he began to feel violent beating of the heart, and his respiration became constrained and difficult. We soon recognised organic disease of the heart: all along the sternum the

bellows-sound was distinctly heard ; pulse frequent, small and regular. After being twenty days in the hospital, he showed us one morning the right arm, which was strongly contracted ; he stated that on awakening he was astonished to find himself unable to extend the hand on the forearm. This latter was also flexed on the arm, and the fingers, being flexed on the palm of the hand, impressed on the skin the mark of the nails. The idea of softening of the brain occurred to us at the moment. He said he had never suffered any pain of the head, dizziness, or disturbance of intellect. He was bled, and blisters applied to the lower extremities. The flexion went off in the night, and on the following morning we found the two extremities of the left side completely relaxed but paralysed. No change occurred on the part of the nervous system. The disease of the heart pursued its course, the limbs became infiltrated, ascites manifested itself, and the patient died suddenly.

Post-mortem. — *Cranium.* — The brain presented nothing remarkable till we got to the level of the optic thalamus and corpus striatum of the left side. These two bodies were changed into a yellowish soft substance. The nervous substance around them was also softened.

Thorax. — Hypertrophy of the parietes of both ventricles, with perceptible diminution of the cavity of the left ventricle. From its origin, and as far as its entrance into the abdomen, the aorta was three times its natural breadth. Towards the middle of the descending portion of the thoracic aorta, there was found a vast aneurismal pouch, which opened into the posterior mediastinum. The latter was filled with large clots of blood. Thence the cause of the sudden death.

Remarks.— This case differs from the two preceding in this, that the flexion of the limb was but temporary, and was soon replaced by simple paralysis. The latter continued till death, which was owing to the bursting of the aneurism of the thoracic aorta. In this case also, as in the others, it is evident, from the sudden appearance of the contraction, without any other nervous phenomenon preceding this lesion of motion, that the softening took place all at once. This is the first case in which we see the alteration seated in the optic *thalamus* and *corpus striatum.*

CASE 8.—Softening of the anterior and middle lobes of one of the hemispheres—Flexion at the commencement—Alternation of flexion and simple paralysis during the course of the disease—Chronic gastro-enteritis.

A woman, thirty-seven years old, was subject from her youth to an almost constant diarrhœa. Digestion had been a long time laborious; at intervals she coughed a little. When we first saw her she was pale and emaciated. Two months before entering the hospital, a curious circumstance occurred to her: from time to time the little and ring fingers of the left hand were flexed with force, towards the palm of the hand, without the patient being able to prevent it. This partial flexion lasted from about a quarter of an hour to two hours ; it then ceased. During the first month, it returned only every three

or four days, no other nervous symptom accompanying it. At the beginning of the second month, all the fingers became flexed, at intervals, on the palm of the hand, and soon after the hand itself was so flexed as to make an acute angle with the anterior surface of the forearm; the hand also was so turned that its palm, instead of being on the same plane as the anterior surface of the forearm, looked outwards. This double flexion of the fingers and hand, from being but temporary, had become permanent when we saw her. Hitherto the forearm itself was not affected; but we soon saw it flexed on the arm, at first temporarily, and then permanently. But what was remarkable, when the flexion of the forearm was well-established, that of the fingers diminished, then ceased entirely, and at the same time that of the hand became less violent. For fifteen days the flexion of the forearm was constant; then it also diminished, and was finally replaced by simple paralysis. For a long time the latter existed in the left lower extremity. For eight days we observed nothing but hemiplegia, without any trace of contraction; then the latter reappeared. Thenceforward the upper extremity of the left side was observed to be, alternately, in states of complete relaxation, and of flexion. This flexion affected, either alternately or simultaneously, the fingers, the hand, the forearm. Three or four times the leg became violently fixed on the thigh. Sensibility was retained in the extremities of the left side; no pain, headache, or any disturbance in the intellect. The diarrhœa, however, became more severe; a large eschar formed on the sacrum, and the patient died.

Post-mortem. — *Cranium.* — Sub-arachnoid cellular tissue infiltrated with a little transparent serum; two spoonfuls of serum in the lateral ventricles. The posterior and middle lobes of the right hemisphere changed, for two-thirds of their extent, into a yellowish mass, in which no vessel is observed, nor any sanguineous effusion. This softening commences about one inch below the convolutions of the convexity; it extends nearly to the level of the optic *thalamus*, without involving that part: anteriorly it is terminated at the union of the two posterior thirds with the anterior third of the optic *thalamus;* posteriorly it reaches nearly to the periphery of the brain.

Thorax. — Some miliary tubercles, surrounded by healthy parenchyma, were scattered through the upper lobe of the left lung.

Abdomen. — Inner surface of stomach presented a slate-coloured tint in three-fourths of its extent. The gastric mucous membrane exhibited considerable thickness, and its consistence was greater than natural. The villosities of the duodenum and of the commencement of the jejunum presented a black tint. Numerous ulcerations, with black ground and raised edges, traversed the mucous membrane of the ileum; some were also found in the cæcum, and at the commencement of the colon. Mesenteric ganglia large, and some contained tubercular matter. Liver pale, friable, and greases the scalpel.

Remarks. — In the cases preceding this, we saw, first the flexion continue during the entire disease; we then saw other cases, in

which, only showing itself at the commencement, it was succeeded by simple paralysis. In the present case, things are quite otherwise; it is, again, by flexion that the lesion of motion exists; paralysis succeeds it; then these two phenomena alternate. Another remarkable circumstance in this case is, that at first the flexion showed itself only at intervals, and between these intervals the extremities recovered perfectly their power of movement. In this case, also, as in all those hitherto detailed, the principal or only seat of the flexion was the upper extremity; the lower extremity, however, participated in the lesion of motion, but frequently it was merely paralysed.

Shall I now say one word regarding the chronic affection to which, for a long time back, the patient had been a prey? This affection followed a course the inverse of its ordinary course. The digestive tube was first attacked, or at least it first manifested symptoms, and in the lung, on the contrary, the lesions seemed only to commence.

With so few disturbances in the respiratory apparatus, the liver had, however, already undergone the fatty degeneration.

Case 9.—Softening of the middle lobe of one of the hemispheres—Hemiplegia without complication of any flexion.

A tailor, sixty-three years of age, entered the hospital much emaciated with jaundice and ascites, of which a liver disease seemed to us to be the cause. One day he complained of extraordinary weight and numbness in the upper and lower extremities of the left side. The hand of this side less able to grasp objects than usual. When he essayed to walk, he said he thought a weight of fifty pounds held his left foot to the ground; no pain of head, dizziness, or sign of cerebral congestion. Ultimately hemiplegia of the left side. About two months after the paralysis appeared, diarrhœa set in, and the patient died without having exhibited to the last moment any additional symptom of disorder of the nervous system.

Post-mortem. — *Cranium.* — A little below the *centrum ovale* of Vieussens, and at an almost equal distance from its anterior and posterior extremities, the right hemisphere presents a softening for a space capable of admitting a nut; this softening is of a greyish white.

Abdomen. — Yellowish serum in the peritoneum; cirrosus of the liver; mucous membrane of stomach marked with bright red dots towards its great curvature; several of the intestinal follicles, and several points of the colon, very much injected.

Remarks. — Here was a well marked case, in which there was no flexion of the limbs. The only phenomenon indicative of softening was paralysis, which was slowly established, as if a gradual compression was made on the brain. Thus, in reference to a lesion constantly identical in its nature and its seat, every case we detail presents to us different functional disturbances. We shall see, in the following fact, paralysis again manifest itself without flexion, and, besides, present at its commencement, and in its progress, cir-

cumstances which will again exhibit to us under a new point of view the symptoms of softening of the brain.

Case 10.—Softening of one of the anterior lobes—At the commencement, signs of cerebral congestion—Subsequently hemiplegia, which again disappeared—Blindness on the side paralysed.

A young man, eighteen years old, of a strong constitution, began to experience, at the commencement of the month of April, a pain of the head, seated principally in the forehead; at the same time dizziness, vertigo, *tinnitus aurium*. With these signs of cerebral congestion, he entered the hospital the 10th of April. He stated the particulars of his own case with the greatest precision. Face red, and expressive of exhaustion; no fever; motion perfect, as was the cutaneous sensibility; sense of hearing impaired for the last three or four days. Twice already, in the course of the two preceding years, he had experienced similar symptoms, always accompanied with some deafness (thirty leeches to the neck: purgative mixture, &c.). In the course of the day, headache, vertigo, *tinnitus aurium* disappeared, as also the deafness, and on the following morning (12th of April) the patient found himself very well. A little after the visit, he began to feel in the upper extremity of the left side a numbness, which went on increasing till night; it was also weaker than the other; he slept during the night, but, on awakening, the left upper extremity was entirely deprived of motion. On our visit of the 13th, we found this limb extended along the trunk, and entirely paralysed; no sign of flexion; sensibility of the skin of this limb still retained; lower extremity of the same side still moveable. The right commissure slightly drawn up; this deviation more evident when the patient smiles; cannot see with the left eye; the two pupils equally dilated; pulse had some frequency (bleeding to twelve ounces, sinapisms, purgative enema). No evacuation from the bowels.

14th. Paralysis extended to the left lower extremity; patient did not answer questions, except when strongly urged (thirty leeches to neck, blisters to thighs, purgative mixture).

15th. Same state; two stools after an enema.

From 16th to 25th. Hemiplegia still continued; every morning we found the left upper eyebrow half depressed over the globe of the eye, and the right commissure of the lips drawn upwards; the tongue, which was with difficulty protruded, deviated a little to the left. From this period to the 1st of May, the patient was twice bled, and leeches were frequently applied, as also sinapisms; still his state was becoming worse, when, on the 1st of May, there was a visible amendment: some movements began to take place in the parts paralysed. On the 4th, he could move the upper and lower extremities tolerably well; lips and tongue no longer deviated; left eye recovered its sight; paralysis of the levator muscle of the left eyebrow ceased; intellect sound; answers accurate; pulse no longer

frequent. In this state of things we began to look forward to his recovery, and for the four days following everything seemed to confirm our hope; but on the 8th, without any known cause, he raved in the night. On the 9th, we found him sunk in profound coma; he spoke not; evinced no pain on being pinched; pulse very frequent; (thirty leeches to neck;) whilst the blood was flowing he emerged from the stupor, and returned to the state he was in on the preceding days. From this period the movements of the limbs improved every day, except that he could not grasp any thing firmly in his left hand. Thus there remained but slight traces of the disease of the brain. But then new symptoms appeared; the tongue became red and dry; severe diarrhœa set in; the skin of the greater trochanter on the left side presented a livid red tint, announcing the approaching formation of an eschar. From this time pulse became very frequent and very small; temperature of skin was raised, and a rapid wasting took place. He was again put on strict diet.

24th. A enormous eschar formed on the great trochanter; diarrhœa very abundant; tongue very red, brown in the centre; extreme debility; intellect still perfect; no trace of the paralysis, but a certain weight in the left lower extremity. Towards the end of May, a large ulcer formed in the external upper part of the left hand; increasing debility. He died in the beginning of June, without presening any additional symptoms connected with the brain.

Post-mortem thirteen hours after death. General marasmus; large ulceration on the left trochanter.

Cranium.— Cerebral convolutions flattened on the upper surface of the anterior lobe of the right hemisphere, from the edge of this lobe to the *corpus striatum*. In this extent the grey colour of the convolutions was replaced by a dirty white colour, shaded by a light rose tint. This portion, when touched, appears diffluent; and its extreme softness forms a striking contrast with the great consistence of the rest of the encephalón. This alteration extended in height from the convolutions of the convexity to those of the base. It occupied nearly all the breadth of the anterior lobe. A reddish liquid filled the lateral ventricles so as to distend them.

Thorax. — Nothing particular.

Abdomen. — Stomach distended with gas and liquids; its inner surface presented a bright redness in several points of its extent. Duodenum white in the first portion. In the second and beginning of the third intestine, its mucous membrane marked by a number of red points crowded together. The inner surface of the cæcum, ascending colon, and a great part of the transverse colon, presented an intense red appearance, arranged in numerous patches. Where these patches existed the mucous membrane was softened.

Remarks. — The symptoms of cerebral congestion presented by this individual on his admission, are such as are frequently met with, and they ordinarily yield to bloodletting, and other antiphlogistic means. Here they were the precursors of a much more

serious affection; hemiplegia complicated them, or rather succeeded them; for it is remarkable, that from the moment the extremities of the left side began to move less easily, the signs of cerebral congestion disappeared; even the deafness ceased. The left side of the face and eyebrow were also affected; the tongue also deviated to the left. In none of the parts paralysed was there any flexion observed. Nearly at the same time the sight of the left eye was lost. In the midst of these disturbances the intellect remained entire, and even at a later period it was only affected at intervals. Coma often appeared, which went away the next day; thus the only constant functional disturbance was that of motion; for the amaurosis of the left side was also but temporary. At last a period arrived when motion itself was so far restored, that there were no longer any traces of paralysis, and the cerebral affection seemed cure. It was then that new phenomena appeared connected with the enormous eschar on one of the trochanters, and with the gastro-intestinal inflammation which arose. It was of these the patient died. Should we expect to find any lesion in the brain? We could scarcely think so, since the symptoms of this lesion had for a long time ceased to exist. Some days before death there was nothing but that general feebleness of motion, sensation, and intellect, characterising the adynamic state, and which is not connected with any specific alteration of the encephalon and its appendages. Notwithstanding, a very serious lesion still existed in the brain; it continued still very intense in the absence of the symptoms to which it first gave rise.

This lesion was limited precisely to one of the anterior lobes, and yet the upper extremity had been paralysed; it extended to the convolutions, and yet the disturbance of the intellect was but a secondary and a transitory phenomenon. In fine, speech was still retained, though the softening was seated in the anterior lobe.

Case 11.—Softening of one of the hemispheres—Injection of the other—Convulsive movements—State of coma on the last day.

A woman, aged twenty-seven years, after having taken much exercise through Paris, during the month of July, was seized with dizziness and pain of head principally seated in front; had no sleep nor appetite for food. These symptoms of lassitude, with tendency to cerebral congestion, existed for ten days, when the patient was submitted to our examination. Pain of the head still continued, occupying only the front of head, and particularly the two supra-orbital regions. Patient had vertigo; felt carotids beat strongly; face red and swollen; a sort of numbness of the limbs; pulse frequent; skin hot; tongue foul (she was instantly bled). Next day, state nearly the same (thirty leeches to anus). From thirteen to fourteen days elapsed from the commencement of the attack, when she was seized suddenly with violent convulsions of the left upper extremity, which returned from seven to eight times during the first twenty-four hours of their appearance, and lasted each time

about twenty minutes. During the intervals the limb enjoyed all its power of motion; the fingers were occasionally observed to be moved convulsively (bled again, and sinapisms applied to the lower extremities). In a day or two the right side of the face also became the seat of convulsions. In the midst of all this disturbance of motion, intellect and sensation were, as yet, sound, but things soon took a different turn. Twenty-four hours after, the convulsive fits became more frequent; affected the entire body; took possession, either successively or simultaneously, of both sides of the face, and of the right and left extremities; they were always more intense in the upper extremities than in the lower; the first signs of cerebral congestion now became more intense, in proportion as the fits became more frequent; face very much injected; intellect, at first struck with stupor, became at last extinct; then coma set in; the convulsions ceased; respiration became embarrassed, and the patient died in a state of asphyxia.

Post-mortem. — The sub-arachnoid cellular tissue of the convexity of the hemispheres infiltrated with a slightly turbid serum; convolutions not changed either in colour or consistence; about two inches below the bottom of the anfractuosities, towards the centre of the space extending between the extremity of the anterior lobe of the right hemisphere and the corpus striatum of the same side, and not far from the interlobular fissure, the cerebral pulp is sensibly softened, and this softened part is of a deep red. This softening may occupy about a cubic inch; around it the cerebral substance considerably injected; in the anterior lobe of the left hemisphere, nearly in the same place, there was observed such an injection of the brain that its substance appeared as it were ecchymosed; the consistence of this part natural.

Remarks. — We do not think the symptoms of cerebral congestion in this case depended on the softening which we afterwards detected. This softening was formed subsequently, and at first there was probably but a greater afflux of blood than natural in the cerebral vessels. We may observe besides what little influence the bleeding exercised on the symptoms of cerebral hyperemia, and consequently on this affection itself. The latter was in some measure the precursor of the more serious lesion, which succeeded it after the lapse of twelve days, and with which the appearance of the convulsive movements was connected. Here then the softening announced itself in a manner altogether different from the preceding cases: the prominent functional disturbance was of motion, but of another kind; it is no longer flexion, as in several cases — no longer paralysis, as in others. The convulsions were first confined to the left side, and it was in the right hemisphere that the softening was found. Subsequently the right side of the body became convulsed in its turn, and there was found in the left hemisphere a lesion less advanced than that of the right hemisphere, which seems to be a first degree of it. We observe, accordingly, that the softening here has a well-marked red colour, and that around it there was considerable injection of

the nervous pulp. One would be disposed then to admit that this redness and injection preceded the softening; and if life had been prolonged, it is extremely probable that the ecchymosed portion of the left hemisphere would have lost its consistence. Besides, the symptoms support this mode of viewing the matter. They were observed to be the same on both sides of the body; and still more the side of the body last convulsed was opposite to the side of the brain where we found the lesion, which we consider as the one less advanced, and as the first degree of the other. The state of coma observed on the last day is only the state in which most persons die who have been subject to convulsions more or less prolonged. But so far the disturbance of motion had not in the slightest degree involved that of the intellect. We should note, also, that the double lesion of the brain was seated on each side in the same point; that this lesion, as in the subject of the ninth case, was in the most anterior part of the hemispheres, anterior to the *corpora striata*, and that notwithstanding the alteration of motion commenced and always predominated in the upper extremities. Neither was there loss of speech; for up to the appearance of the comatose state, the patient constantly explained how she felt without evincing any difficulty of articulation.

Case 12.—Softening in the two hemispheres—Paralysis of long standing; subsequently tetanic rigidity of one of the arms produced by a new softening—Delirium towards the end.

A man, fifty-five years old, entered *La Charité* with hemiplegia of the right side. We learned from him that he had lost by degrees the motion of the right side, without having ever had either contractions or convulsions. Though he explained his state very well, and evinced no aberration of intellect, still there was a vagueness in his answers which denoted a degree of mental debility. At the end of three months, his state became suddenly changed; the habitual torpor in which he had been frequently plunged was succeeded by a general state of agitation; he was quite delirious; extremities of the right side immoveable and flaccid as usual; those of the left side presented new phenomena. Thus the upper extremity, which was no longer capable of voluntary motion, was extended along the trunk, and presented a rigidity like to that of tetanus; it was not flexion (*contracture*); the patient, by a sort of automatic motion, constantly threw off his bed-clothes with his left leg. The next day we no longer found any trace of the excitement of the preceding day. The delirium was replaced by a dulness of intellect; the left extremities were paralysed like those of the right side; the five following days the features became altered; the face was yellow; tongue dry; pulse very frequent; abdomen tympanitic; severe diarrhœa set in, and the patient died.

Post-mortem. — Pia mater injected over the centre convexity of the hemispheres; the nervous substance, very firm except in one point, which we shall mention, was, as it were, dotted with a great

number of red points. At the anterior and inner extremity of the left hemisphere, the latter appeared as if depressed, and gave to the finger the sensation of the parietes of an empty cavity; the arachnoid covering this portion of the brain was of an intense red colour; beneath it the cerebral substance was reduced into a soft mass of a rose-white colour; this softening extended posteriorly as far as the *corpus striatum*, the most posterior part of which it hardly reached; it penetrated in depth to a little above the level of the *centrum ovale;* and was in breadth three inches. In this same left hemisphere, exterior and a little anterior to the optic *thalamus,* and on a level with it, there existed, to the extent of two inches in every direction, a second softening, of a chocolate colour.

In the right hemisphere, the *corpus striatum* presented to us in the middle part a third softening, of a yellow reddish colour; it was limited exactly to the central part of this body, which, around it, had preserved its usual colour.

Remarks. — The double softening of which the left hemisphere was here the seat, gave rise to no other phenomena than to a progressive diminution of motion, in the right extremities, and ultimately to their complete paralysis. In this case, nevertheless, there was not more intellectual torpor than in the preceding cases. Though this softening, existing in two different points, had occupied rather an extensive portion of the left hemisphere, the disease followed a course altogether chronic; the softening of the right hemisphere, on the contrary, though far less considerable, produced more acute symptoms. It is on it that the tetanic rigidity of the right arm depended, which we have not yet noticed in any of our cases, and which must not be confounded with flexion (*contracture*); this is also the first time we see delirium appear; but in this case was it not owing to the manifest hyperemia of which the meninges were the seat? This case resembles the preceding in the nature of the softening, which, wherever it existed, was coloured with different red shades.

With respect to the softening, here, again, as in several of our cases, it was not indicated by the seat of the lesion of motion. In the left hemisphere there was indeed double softening; one in the anterior lobe, the other in the middle lobe, and the two extremities of the right side were paralysed; but in the right hemisphere the middle part of the *corpus striatum* is the only part altered, and yet the left upper extremity presents in its movement a disturbance which can only be explained by this lesion; the lower extremity, on the contrary, manifests neither paralysis, nor flexion, nor convulsion, nor tetanic rigidity.

Case 13.—Softening of the optic thalamus of the right side—Diffluent state of the fornix—Tetanic phenomena at first—Subsequently alternations of paralysis and convulsive movements on the left side of the body.

A pavior, thirty years of age, of a strong constitution, experienced on a sudden, without any known cause, a rigidity of the nape of the

neck; retroversion of the head; trunk soon after inclined in the same direction. On entering the hospital, after a lapse of six days, his state was as follows: — Strong retroversion of the head; patient could neither move it forwards, nor incline it to either side; trunk arched, so that the middle of the back no longer rested on the bed; acute pains in the back of the neck, which were not increased on pressure; the jaws presented the commencement of trismus. No other functional disturbance. (Patient was bled from the arm; two days after, thirty leeches to anus.) Some days had now elapsed, and no change; retroversion of the head continued, as well as the incomplete trismus already noticed; but farther, the muscles of the extremities and of the abdominal parietes presented a commencement of rigidity. The patient said he felt some uneasiness in the arms. Thus tetanus, at first partial, was now become general, and already lasted for fifteen days. (He was bled again.) The following day, the disease presented another aspect. The retroversion of the head continued, but it was at the same time inclined to the left; the rigidity of the abdominal parietes and that of the extremities disappeared; but the left upper extremity had lost all power of motion; when raised, it fell back, as an inert mass; the skin of this part when severely pinched, gave the patient no pain; he had his eyes shut, and seemed asleep; but we could, by speaking to him, arouse him from this stupor, and then his answers were accurate; he could not tell us at what period his left arm became paralysed; he said he did not recollect; and he was very much astonished at not being able to move it; he said he no longer felt it. Pulse acquired a slight frequency. Fifteen leeches were applied across each jugular vein, and a blister to each leg; during the day, and whilst the leech-bites were bleeding, the paralysed limb was seized with convulsive movements. On the next morning we found the stupor still more profound; pupils very much dilated; they contracted, however, to the light. No appearance of convulsion during the visit; the paralysis of the left arm seemed as marked as on the preceding day; pulse frequent; respiration accelerated. A little time after we left the patient the convulsions reappeared, but this time they were not confined to the paralysed limb; the face and both sides of the body were several times affected with them.

The two following days, no convulsions: left arm remained constantly in a state of simple relaxation; the other limbs moved at the will of the patient; he was in a constant stupor; when spoken to, he opened his eyes, strove to answer, but could not articulate; pulse very frequent and very small; pupils very much dilated, still they contracted under the impression of light. Next day, the scene changed; great agitation; continual screams; face covered with sweat. In the course of the day, violent convulsions, extending over the whole body, in the midst of which the patient died.

Post-mortem. — Pia mater surrounding the brain, both at the convexity and at the base, very much injected; the superficial grey

substance of the convolutions participates in this injection; the lateral ventricles filled with limpid serum in such a quantity as to distend them; the posterior part of the *fornix* changed into a dull white diffluent mass; the right optic *thalamus*, in its middle part, presents a softening as perfect as that of the *fornix;* it differs, however, in this, that it presents a reddish tint; near its periphery this ganglion resumed all its consistence.

Remarks. — Three periods may be distinguished, with respect to the symptoms, in the disease which forms the subject of the preceding case. First period was marked by phenomena resembling those of tetanus; with these the disease commenced. In the second the tetanic phenomena disappeared, and nothing was observed but simple paralysis, limited to one of the upper extremities. In the third period, in fine, this paralysis alternated with convulsive movements, which, developing themselves only in the part deprived of motion, then extend to the entire body. Intellect free during the first period. In the second and third periods, a stupor was observed, which at first did not prevent the patient from answering distinctly the questions put to him. At a subsequent period this stupor became more profound, and ultimately was replaced by a convulsive agitation, in which the patient died.

To explain these complex symptoms, we find lesions equally complex, whose precise part in causing the symptoms it is rather difficult to assign. And first, it may be asked, if, in the first period, at the time when nothing was yet observed but symptoms of tetanus, the right optic *thalamus* was already softened. Did these symptoms depend rather on an affection of the meninges? But then there would have been some disturbance in the intellect. Now, that did not take place. Thus we are inclined to think, that the bright red injections of the pia mater, and of the convolutions, ascertained by the *post-mortem*, were formed only in the the third period, at the time the intellect became disturbed. Did those symptoms of tetanus depend rather on the softening of the fornix? The only answer we can give to this is, that we have frequently found on the dead body a similar softening, without anything similar having taken place during life. In no case have we seen softening of the fornix, whether partial or general, produce any cerebral symptoms whatever. We cannot, then, assert positively that the lesion which produced the tetanic symptoms was of the number of those revealed by the *post-mortem*. Perhaps the softening of the right optic *thalamus* took place during the morbid process which produced the tetanus. The phenomenon which no doubt depended on it, the paralysis of the left arm, showed itself only at the same time that the tetanic phenomena ceased. With respect to the convulsions, it is probable that they depended on the affection of the membranes, and of that of the grey substance subjacent to them. The partial convulsive movements which opened the scene, and which occurred in the paralysed limb, might alone have been referred to the softening of the optic *thalamus*. It is probable that the great distension of the

ventricles by serum performed a part in the production of the stupor. This case, contrary to several of the preceding, might be urged in favour of the opinion of those who place the source of the movements of the upper extremities in the optic *thalami*.

CHAPTER III.

CASES WHEREIN, WITH DIFFERENT LESIONS OF MOTION, THERE EXISTED A LESION OF SENSIBILITY.

According to some of those who have written on softening of the brain, pain of the head is one of the most constant symptoms, and it marks particularly the commencement of the affection. The examples already quoted prove at least that, in a considerable number of cases, this symptom may be wanting. We shall now see a case where pain of head was a predominant symptom.

But it is not merely by pain of head that softening may announce itself. There are cases also where, whether this headache exists or not, the patients feel in different parts of the body, and particularly in the extremities, acute pains, sometimes continued, sometimes intermittent, which precede the other symptoms, or complicate them. These pains might occasionally impose on one for rheumatic pains. It is then very important to be at least apprised of the possibility of their existence.

Case 14.—Softening of the right hemisphere—Hemorrhage into the other hemisphere—Pain of head, with commencing paralysis of the limbs of the left side—Subsequently, violent attack of apoplexy.

A woman, fifty-three years of age, had always enjoyed good health. In the month of September, 1831, she began to feel at the junction of the temporal and parietal regions of the right side, a pain which was at first dull, and existed only at intervals. At the end of a fortnight, the pain became more acute; every two or three days it was suddenly aggravated. After remaining thus from seven to eight minutes, it diminished, still acute enough to prevent her from her usual employment. She then applied to a physician, who bled her; the pain was not diminished. Two or three days after, she perceived that she could not hold objects as well with her left as with her right hand. She then entered the hospital *La Pitié*. At this time she had had pain of the head about twenty-five days; intellect sound. From the nature of her headache, we would have employed sulphate of quinine, combined with opium, suspecting it to be nervous, did there not exist in the left extremities phenomena which seemed to indicate compression or disorganisation in some part of the right cerebral hemisphere. These phenomena were the following:—The

patient felt in these limbs, for the last few days, a degree of debility, which continued to increase. She could, however, move them, but with more difficulty; and when she tried to walk, she fancied her left leg was about to be withdrawn from under her. The pulp of the fingers of the left hand were the constant seat of troublesome formication; sensibility of skin natural. She was bled again, without any effect of any kind. Twenty leeches were applied twice to the anus, and a large blister to the nape of the neck. One day, whilst walking in the ward, she fell down, deprived of consciousness and motion. On the following morning we found her in the state of one who had been just struck with apoplexy. She died in the evening.

Post-mortem. — Meninges very much injected; sanguineous suffusion in the pia mater covering the left hemisphere. On removing some slices from the left hemisphere, the scalpel dipped into a large cavity filled with black blood, having the consistence of currant jelly. It occupied at least one third of the hemisphere; the optic *thalamus* and *corpus striatum* were affected, and the blood burst into the left ventricle; the septum was not injured. The right hemisphere presented quite a different appearance; externally it appeared healthy, as the left; but at two inches depth it began to lose its consistence; at first, a little softer than at its periphery, it was changed a little lower down into an inorganic mass of a dirty grey colour, traversed by some vessels, without any of the blood in them having spread. This softening terminated anteriorly towards the anterior part of the *corpus striatum*, and behind, extended a little beyond the posterior extremity of this body. It terminated inferiorly towards the level of the *corpus striatum*, being situated more externally than it, and it left it completely sound.

Remarks. — If in the 13th case we were puzzled in connecting the several lesions with the symptoms, such is not the case here, where every thing is plain and manifest. The pain of the head and commencement of paralysis of the left extremities are explained by the softening of the right hemisphere. The copious hemorrhage of the other hemisphere accounts for the phenomena observed towards the close. But why this remarkable pain of head in this case, which was wanting in the other cases cited? Pathological anatomy no longer explains these differences; the lesion found has the same seat, and, as far at least as we can judge, is of the same nature. We see, besides, how long a time this pain of head remained the only phenomenon; how long a time also it seemed to be but one of those simple nervous pains, which disappear as they come, without leaving behind them any trace of their existence. In what state was the brain, as long as the headache existed alone? What new lesion complicated the change which had produced the headache, when the latter was followed with an alteration of motion? These are very interesting questions, which we are as yet unable to solve, the solution of which, however, may be conceived to be possible by the aid of patient investigations.

Case 15.—Softening of the right cerebral hemisphere—Acute pains in the left extremities, which subsequently become paralysed, still continuing painful.

A woman, seventy-one years old, had felt, for about a year before entering the hospital, acute pains in the two extremities of the left side. These, which were at first transient, became lancinating, occupying particularly the anterior surface of the upper extremity, and the posterior surface of the lower extremity. When they were very intense, they gave rise occasionally to slight convulsive twitches of the fingers, and particularly of the index finger. Occasionally too, but only after, or during a pain, the thumb was flexed on the palm of the hand, this flexion never lasting beyond ten or twelve minutes. This was the first time the patient experienced such pains; by degrees they became more frequent, and at last continued; but at the same time they abated of their original severity, and ultimately the patient only felt in the extremities of the left side, and particularly in the upper, a sensation of formication. She continued thus for five months; she then ceased to be able to sustain herself on her left leg as well as before: this limb seemed to her dull and heavy, and she dragged it a little in walking. At this time also the left upper extremity became weaker; she could no longer grasp, or hold any weighty object with the hand of this side. By degrees, this paralysis increased; and at the end of six weeks, it was as complete as possible. But, what was extraordinary, from the time the muscles of the extremities of the left side were entirely deprived of voluntary motion, the pains which had marked the commencement of the disease returned with their original severity, and from time to time they increased so as to make her shed tears. This was the state she was in when she was submitted to our inspection. She was at this time emaciated and pale, eyes sunk, features drawn and expressive of long suffering. Every two or three days the extremities were as it were furrowed by acute pains. The skin of these parts much more insensible than those of the limbs of the right side. Power of motion completely destroyed in them; right commissure of the lips drawn up; tongue deviated visibly to the left; skin of face on right side less sensible than on left; the intellect perfect. She told us that from her nineteenth to her twenty-third year, she had been tormented with violent beating of the heart, accompanied with great difficulty of breathing. These symptoms, however, completely disappeared. After remaining about a month in the hospital, a large eschar formed on the sacrum, she gradually wasted away, her feet became œdematous, and she sank exhausted, retaining her intellect to the last.

Post-mortem. — On a level with, and external to the optic *thalamus* and *corpus striatum* of the right side, we found considerable softening of the cerebral substance, which extended to the base of the brain. Anteriorly, it was limited by a line, the internal extremity of which might terminate at the junction of the anterior four-fifths with the posterior fifth of the *corpus striatum*. Backwards it extended nearly to the posterior extremity of the hemi-

sphere. No injection in the softened portion. The softened cerebral substance is of a greyish white in certain points, and yellowish in others. The *fornix* and *septum lucidum* diffluent. The two lateral ventricles distended with serum. The great arteries of the brain ossified. Heart and lungs healthy; some ossifications in the aortic valves. The gastric mucous membrane visibly softened towards the great curvature in several points.

Remarks. — There have been recently mentioned some cases of neuralgiæ of the trunk and extremities, connected with alterations of the spinal marrow appreciable by anatomy. In the above case, might not one also have taken for simple neuralgic affections those pains which, on the left, occupied principally the course of the great nervous cords, and which, for several months, were the only morbid phenomenon? We should observe, also, that like all purely nervous pains, they first assumed an intermittent form. Far from ceasing, they reappeared with new intensity, when the limbs in which they were seated began to be paralysed. And what is truly singular, at the very time when they were most acute, the skin felt but in a very dull manner the impression of external bodies. Thus the sensibility, exalted in the deep-seated parts of the limbs, was extinct at their circumference.

Case 16.—Softening of the anterior extremity of one of the hemispheres—At the commencement, headache, and acute pains in different parts of the body—Subsequently flexion and hemiplegia—Death by supervening pneumonia.

A female, nineteen years of age, seven months before entering the hospital, felt a dull pain in the right temple, which, becoming worse from time to time, was afterwards general, and accompanied with great depression; it often, when very acute, extended to the nape of the neck, thence descended towards the left side of the neck, and involved the entire left upper extremity, extending occasionally to the left lower extremity. These pains were very changeable in character; sometimes she felt as if needles were pushed in her; sometimes as if subjected to very intense heat; pressing the muscles, also, sometimes gave pain; the skin of the left extremities sometimes, too, became painful. Such were the affections of the sensibility, when, in its turn, the power of motion also became affected; the fingers became flexed on the hand, the hand on the forearm, and the latter on the arm. The left lower extremity soon participated in this flexion. From the moment the latter supervened, the pains assumed increased intensity. In this state we saw the patient. She then complained of violent pains in the two extremities; flexion was at its very highest degree. Headache continued, but less acute. (A seton was put in the nape of the neck, the flexed limbs rubbed with anodyne liniment.) From fifteen to twenty days passed on without any change; she then exhibited the following modification in her condition: — Pain of the head now changed into a sensation of weight in all the left side of the head; extremities no longer painful; the skin covering

them now insensible; fingers and toes benumbed and cold; the flexion was now gone, and was replaced by the mere abolition of motion in the left extremities; the left side of the face participated in this paralysis, and the right commissure of the lips was drawn up. Whilst in this state, the patient was attacked with pleuro-pneumonia, of which she died.

Post-mortem. — The entire anterior lobe of the right hemisphere changed into a greyish soft mass. The *corpus striatum* and anterior portion of the optic *thalamus* participate in this change, which did not, however, extend to the convolutions of the convexity, nor to those of the base. These convolutions were merely flattened. A mixture of red and grey hepatisation of the inferior lobe of the left lung.

Remarks. — Three periods marked the course of this disease. In the first, the whole disturbance was of the sensibility; acute pains occupy, simultaneously or alternately, first the head, then the nape of the neck, then the limbs opposite the side of the head affected. These pains are remarkable both for their intensity and for their character: one might take them for mere nervous pains. After several months comes another period, during which disturbance of motion is added to that of sensation; the painful limbs become the seat of slight convulsions, which are soon succeeded by strong flexion. From that time the nature of the disease became more evident; but in its successive phases it was not to rest there, and, at the end of a certain time, it entered in some measure into a third period, during which simple paralysis replaced the flexion of the limbs. Then the pains cease, and the sensibility of the skin, recently so much exalted, is itself destroyed. All this succession of phenomena takes place during a space of from eight to nine months, and the cerebral disease did not yet finish its course, when pneumonia carried off the patient. Amidst all these disturbances of sensation and motion the intellect remains sound; towards the end only a difficulty of speech supervened, which was this time connected with the seat of the lesion in one of the anterior lobes. It is worthy of note, besides, that the convolutions did not participate in the softening; and thus the intellectual faculties were preserved so entire, notwithstanding the great extent of the lesion. We see, also, that in this case, where the change of motion affected the two extremities, the optic *thalamus* participated but little in the very complete softening of the portion of hemisphere anterior to it.

Thus pains in the limbs, accompanied or not with headache, may exist for a long time, at least, as the only symptom of softening of the brain. In the face of these facts, what becomes of the hypothesis, which assumed, that the alterations of the sensibility denoted an affection of the cerebellum? It was also asserted, that diseases of the brain, like to those of the lungs, were not accompanied with pain, unless the serous membranes covering them were also affected. Now, in the cases just detailed, the membranes remained perfectly

sound, and still there was pain. No inference is to be drawn for pathological purposes, from those frequently quoted experiments, in which, on cutting the cerebral substance in different directions, no appearance of pain was evinced by the animals.

CHAPTER IV.

CASES IN WHICH LOSS OF SPEECH WAS THE ONLY SYMPTOM, OR ONE OF THE PREDOMINANT SYMPTOMS.

Case 17.—Softening of the two hemispheres—Loss of speech, without lesions of intellect, motion, or sensation.

This was the case of a woman, eighty years old, who, three years before entering the hospital, was suddenly deprived of speech; never had loss of consciousness; motion and sensation of the four extremities in the normal state; the senses of hearing, sight, and smell natural. She presented the signs of organic disease of the heart. After entering the hospital she daily became more debilitated; respiration more embarrassed; the tracheal rattle set in, and she died at last of pulmonary disease.

Post-mortem. — *Cranium.* — 1st. *Left hemisphere.* — On a level with, and external to, the posterior extremity of the *corpus striatum*, entirely at its apex, there is a softening of the cerebral substance: the portion softened is of a greyish colour.

2d. *Right hemisphere.* — At the junction of the anterior and posterior half of this hemisphere, at an equal distance from its internal and external edges, and at the point of junction of the two upper thirds with the lower third of the nervous mass, situated above the *centrum ovale* of Vieussens, there is a softening similar in every respect to that of the opposite side. Small serous cysts scattered in great numbers through the choroid plexus.

Thorax. — Heart large; parietes of the left ventricle very thick; the right and left cavities filled with black blood, which has the consistence of currant jelly. Bony incrustations in the aortic valves, and over the entire extent of the aorta; large quantity of serum in pericardium and right pleura; the right lung presents, towards the inferior part of its upper lobe, a portion of its tissue the size of an orange, exhibiting all the characters of pulmonary apoplexy.

Remarks. — This case is well adapted to invalidate certain opinions published in later times. Thus, the only cerebral phenomenon which existed was loss of speech, and the only lesion of the brain discovered was not seated in any of the points of the encephalon, to which the faculty of speech has been assigned.

Case 18.—Softening of the left corpus striatum—Loss of speech—Hemiplegia—Preservation of the intellect.

A woman, seventy-three years old, had enjoyed good health, and in particular never complained of headache, when suddenly, without loss of consciousness, she felt her right leg become flexed under her, and she fell. On being taken up, she was found paralysed on the right side. Two days after she was brought to *La Pitié:* the two extremities of the right side deprived of motion; the patient *cannot speak;* intellect perfect; when asked whether she has pains, she puts her hand to the right side of the face; tongue inclines to the right. After having been bled twice without any benefit, and signs of pulmonary engorgement coming on, she died in a state of asphyxia.

Post-mortem. — On the right and near the great interlobular fissure, a fibrous body, the size of a hazel-nut, was imbedded in the dura mater. The large veins passing between the convolutions gorged with blood; pia mater injected. The only alteration in the encephalon is in the *corpus striatum* of the left side, which has lost its natural consistence.

Remarks. — The seat of the softening here is worthy of remark; it is exactly limited to one of the *corpora striata*, which does not prevent both extremities from being paralysed, together with loss of speech.

CHAPTER V.

CASES IN WHICH, WITH DIVERS DISTURBANCES OF MOTION AND SENSATION, THERE WAS DISTURBANCE OF THE INTELLECT.

The cases next to be considered are naturally divided into two groups. In the first we shall find cases where the intellect is entirely destroyed in a manner quite instantaneous. The patients deprived of consciousness are plunged into a state of coma more or less profound. In such cases, the softening of the brain bears the greatest resemblance to hemorrhage of this organ. A second group presents us cases altogether different: namely, — of individuals, in whom the coma, when it does exist, comes on but gradually; their intellect is not suddenly destroyed, as in the preceding class, but it is perverted, or merely weakened, and they present, as a prevailing phenomenon, a delirium variable in its intensity and its forms. In cases of this kind, softening of the brain differs very widely in its symptoms from hemorrhage, and, on the contrary, it approximates, in certain respects, to some forms of inflammation of the meninges.

ARTICLE I.

SOFTENING OF THE BRAIN, WITH COMPLETE AND SUDDEN LOSS OF CONSCIOUSNESS.

CASE 19.—Weakness of the right extremities of an old standing—Suddenly a fall with loss of consciousness—Coma—Softening of one entire hemisphere.

A man, forty-seven years of age, felt, for the last two years, a pain in the left side of the head, and since about the same period, the extremities of the right side were weaker than those of the left. Suddenly, after complaining of his head more than usual, he fell to the ground, deprived of consciousness. After two days he was brought to *La Charité*, where he presented the following state:—Profound coma; respiration stertorous; sense of hearing seemed gone; on raising the lids, globe of the eye fixed; pupils contracted; sensibility of conjunctiva seemed gone; face very red, and as if swollen; mouth deviated to left side; the four extremities relaxed; when raised they fell back as so many inert masses; sensibility seemed quite abolished; pulse very small, not frequent (bleeding, blisters to legs). He died the next day.

Post-mortem. — *Cranium.* — A striking difference in the size of the two hemispheres, that of the left side occupied much more space than the other, so that the great interlobular fissure was no longer on the median line, but was thrown to the right of this line; the convolutions of the convexity of the left hemisphere flattened. A very little distance beneath them the cerebral substance became extremely soft; a little lower still it was converted into a greyish mass. The same state of diffluence was observed in all the rest of the hemisphere, nearly to its base. In all this softened mass no effusion of blood; it was crossed in different directions by vessels, whose parietes retained their natural consistence.

Thorax. — Great congestion of the lungs; heart very large; hypertrophy of its parietes; contraction of the aortic orifice; its valves as it were soldered together.

Abdomen. — Liver gorged with blood; injection of the gastro-intestinal membrane.

Remarks. — In none of the preceding cases have we seen such extensive softening. Here the intensity of the lesion is conformable to the severity of the symptoms. The patient presented all the phenomena of abundant cerebral hemorrhage. The relaxation of the four extremities explained by the pressure of the tumefied left hemisphere on the other. Could any one have inferred from the state of the patient on his admission the real nature of his disease? We think not. But valuable assistance might have been furnished by the previous history. This person, be it recollected, had for a long time back weakness of the extremities, and pain in the left side of the head. Such phenomena were connected much more with the idea of softening than of hemorrhage. It is probable that this softening slowly formed, remained confined to a small extent of the left hemisphere up to the day the patient fell deprived of conscious-

ness. Here again we have softening without hyperemia, for we must not refer to a state of sanguineous congestion the vascular network which appeared in the middle of the nervous mass. This network was the natural state. It is truly remarkable to see, whilst the nervous substance all around is reduced to an almost liquid state, the vessels traversing it, and which must participate in its life, preserve their normal consistence — an admirable example of the independence of the vital action of different tissues, though confounded in one and the same organ. Thus may be explained why a softening, however considerable, does not necessarily bring on a hemorrhage.

Case 20.—Pain of head on the right side, with numbness of the left extremities for some days, then sudden loss of consciousness—Hemiplegia on the left side—Softening of the middle part of the right hemisphere.

This was the case of a woman, sixty-six years of age, who complained of an acute pain in the right temple; her left extremities seemed benumbed and heavy. After about a week her headache increased; her right leg bent under her, and she was put to bed; a little after she was seen to place her hand to her head, and very soon she was deprived of consciousness. Some hours after she was brought to hospital: her state then was — Profound coma; total insensibility to external impressions; extremities of the left side when raised fell again like inert masses; respiration stertorous; pulse hard, seventy-two; she died in the night.

Post-mortem. — On the level of, and outside, the optic *thalamus* of the right side, there was considerable softening to an extent capable of admitting an orange; this softening reached the posterior third of the *corpus striatum*, and a part of the optic *thalamus*.

Remarks. — There was great resemblance between this case and the preceding: in the former the headache, which announced the cerebral disease, lasted for two years, whilst in the second it did not extend beyond a few days. In the latter case also, there was no hemiplegia, which is accounted for by the smaller extent of the softening, which did not, as in the first case, exert any influence on the sound hemisphere.

Case 21. — This was the case of a porter, who had been exposed for some time to the vapour of charcoal, after which he suffered for three or four days dizziness and pain of head; the dizziness went off, but the pain became concentrated towards the region of the left parietal bone; about a month after he fell down suddenly deprived of consciousness and motion. The case bore a great resemblance to the preceding two.

Case 22.—Debility of the right extremities of long standing—Sudden loss of consciousness—Hemiplegia on the right side, and contraction on the same side—Convulsive movements and cataleptic phenomena of the left side—Softening in each optic thalamus.

A man, seventy-seven years old, of full habit, complained for a

long time of the right limbs being weaker than the left; one morning he suddenly lost all consciousness and was conveyed to the hospital, where he presented the following symptoms: — Incomplete hemiplegia of the right side; left arm agitated with involuntary movements; face flushed, expressive of stupor; eyes closed; left pupil slightly dilated, and the right contracted; sense of hearing impaired; tongue protruded with difficulty, deviates a little to the left; pulse frequent and small; respiration embarrassed. He was bled twice the first day of his admission, and had sinapisms to his legs; after two days he seems better; respiration easier; tongue more easily protruded, and deviates less. He wishes to speak, but we hear only inarticulate sounds; pulse accelerated, small, a little more developed in the right; the arm of this side performs some weak movements; forearm flexed; fingers also slightly so; the left arm having been raised by mere chance, then left to itself, it was observed that it retained the various positions which had been given to it for a very considerable time; the lower extremity of the left side did not exhibit this cataleptiform state. Two days afterwards he seems still better; stupor less; opens his eyes and speaks; answers questions accurately; catelepsy of the left arm diminished. On the next day return of the stupor; pulse small; right arm performs some movements and presents no sign of flexion; left arm now contracts with force when we wish to move it; all the symptoms becoming worse; he died in a few days.

Post-mortem. — Strong adhesions between the dura mater and cranium; membranes covering the anterior and middle part of the cerebral hemispheres thickened and a little opaque. In each of the hemispheres the following alterations were discovered: — 1st. In the left hemisphere, the posterior and middle part of the optic thalamus presented a softening the size of a hazel nut — here the cerebral pulp was converted into a yellowish mass. 2d. In the right hemisphere the optic *thalamus* presents a softening of small extent towards its internal posterior part: in the centre of the softening a small quantity of blood infiltrates the nervous pulp.

Remarks. — Here, at first view, it is difficult enough to connect the symptoms during life with the lesions found after death. It is probable that the gradual debility of the right side, that preceded the loss of consciousness, depended on the process of softening, which had already commenced in the left optic *thalamus*. This weakness was converted into paralysis, the same day on which the coma supervened; and soon after this paralysis became complicated with flexions of the limbs. This succession of phenomena indicates a progress in the softening of the left optic *thalamus;* and if, subsequently, the contraction disappeared, if the paralysis itself diminished, so that the patient was able to perform some movements with the right arm, we must thence conclude that the process of softening was arrested in the left optic *thalamus*, or that the inflammation accompanying it had become less intense. So far every thing is well explained, but such is not the case with other phenomena, of which we have now to speak. What was the cause

of the convulsive movements of the left arm, and of the cataleptiform state it subsequently presented? Was it the softening, with sanguineous infiltration found in the right optic *thalamus?* We do not think so; for then the arm would not have recovered its movements. We think that the last mentioned phenomena depended on the partial meningitis, which was proved to have existed. It seems probable that the softening of the right optic *thalamus* took place only at a late period: to it we would refer the return of the coma, and the rigidity of the left arm the day before death.

Case 23.—Sudden loss of consciousness and motion—Momentary return of intellect—Delirium at intervals—Pain of the head—Softening of one of the corpora striata.

A woman, forty-seven years old, was suddenly seized with violent pain of the head and dizziness: she could not sustain herself on her legs, and staggered as if drunk. After some hours she lost all consciousness; but recovered a little in half an hour, with a paralysis on the right side. She was brought to *La Charité;* we saw her about fifteen hours after the first attack; intellect weak; still she could understand and answer our questions; she gazed at us with an astonished air. When asked if she suffered pain any where, she pointed to the head; articulation difficult; mouth dragged to the left; both extremities of the right side wholly deprived of motion; sensibility of the skin covering them impaired. For the twenty days following, she continued nearly in the same state; only, occasionally, her intellect became disturbed; memory gone; constantly complained of pain at the left side of the head. She became emaciated; appetite gone; a large eschar on the sacrum; tongue dry; fæces discharged involuntarily. She died in an adynamic state about forty-eight days after her admission; delirium constant for the last eight days of her life; she had been bled twice after entering the hospital, blistered at the nape of the neck, and some purgative mixture given to her.

Post-mortem. — Pia mater covering the convexity of the hemispheres infiltrated with a considerable quantity of turbid serum; the arachnoid was raised from it; a similar liquid filled the left ventricle; left *corpus striatum* occupied by a softening about an inch and a half in length, and one inch in breadth. In the centre of this softening, which was of a yellowish colour, were seen three small red points. All the *corpus striatum* was in general softer than on the opposite side, and the cerebral substance around it, for the extent of some lines, had also less than its natural consistence.

Remarks. — The time which elapsed, in the case of this individual, between the first cerebral phenomena and the loss of consciousness, was shorter than in the others. These phenomena were such as characterise cerebral congestion. The paralysis was not ascertained till after the loss of consciousness. The latter was of less duration than in the preceding cases. When the patient came to herself, her intellect was still somewhat impaired, and embarrassment of speech was one of the prevailing phenomena.

We call attention to this delirium, which manifested itself at a subsequent period, at first by intervals, and then in a continued manner. Was this connected with the state of the meninges? Shall we find it accounted for in the turbid liquid which infiltrated the pia mater, and which filled the ventricle situated on the side of the softening? At no period of the disease did we find contraction in the paralysed limbs.

Case 25.*—Somnolence at first; at a later period, momentary loss of consciousness, followed by hemiplegia—Death by an affection of the heart—Softening of the optic thalamus and corpus striatum of the right side—Tubercular affection of the testicles—Aneurism of the heart.

A man, forty-three years of age, felt, for several years back, an habitual oppression, which increased on every muscular effort. For the last year, the dyspnœa increased very much; and for a few months past he perceived his left testicle to become very large. When he entered *La Charité*, we were at first struck with the pale yellow tint of his face. He lay on his back in bed; scarcely felt any dyspnœa when he abstained from motion; sleep tranquil enough; frequent attacks of dizziness. The hand, applied to the præcordial region, distinguished the beatings of the heart but very obscurely. When heard with the stethoscope, they were very irregular and tumultuous; being heard but very slightly along the sternum, and on the right anterior side of the thorax. Pulse very small, irregular, occasionally imperceptible. We shall see how far these signs were from indicating the state of the heart. The patient presented no change in his state during the first month of his stay in the hospital. At the end of this time he was observed to have a great tendency to stupor. Soon after he remained in a continued state of somnolence. However, he was easily aroused, and then his intellect was clear; his movements were quite free. We asked him frequently whether he had pain of head, and he always answered in the negative. Respiration not more constrained than usual. This state of somnolence continued for three or four days, when one morning we were struck with the change in his pulse; it was small till then, but now became full and very hard; skin unusually hot. During the night he suddenly lost consciousness; he recovered it in about a quarter of an hour. On the next morning the left extremities, hitherto so free in their functions, were now deprived of motion; the sensibility of the skin of these parts impaired; right commissure of the lips drawn up, and at each expiration the left cheek is distended with air. In two days more the respiration became suddenly more difficult, and in about forty-eight hours he died, after having passed through all the degrees of asphyxia.

Post-mortem. — *Cranium.* — On the right side the *corpus striatum* and optic *thalamus* no longer existed. In their stead was found a soft white substance slightly rose coloured in several

* We omit the 24th, as containing nothing very different from the preceding.—Tr.

points, yellowish in others. This morbid change extended from one to two inches into the nervous substance which divides externally the *corpus striatum* from the optic *thalamus*.

Thorax. — Lungs infiltrated with a prodigious quantity of frothy serum. Heart of an enormous size, owing both to dilatation of its cavities and hypertrophy of its parietes. Not far from its apex, for a space equal to the size of a five franc piece, the parietes of the left ventricle became suddenly very thin, scarcely equalling the auricles in thickness. In this part there existed interiorly a sort of pouch like the aneurismal sac of arteries; parietes of right ventricle equally hypertrophied: an enormous clot, of great density, filled its cavity, and extended into the auricle: it adhered intimately to the carneæ columnæ of the ventricles. Was it formed during life? Had it any share in the production of asphyxia? Aorta very large.

Abdomen. — Liver gorged with blood: intestinal mucous membrane generally injected: a limpid colourless serum effused into the tunica vaginalis of the right side: in the testicle of this side were found five or six small cavities filled with a substance like softened tubercular matter.

Remarks. — Before the autopsy, what physician would not have admitted, in this case, the existence of cerebral hemorrhage? All the symptoms appeared to indicate it. The individual was affected with organic disease of the heart, and was for a long time subject to dizziness. There was a commencement of cerebral congestion; then stupor comes on, indicating a more serious degree of this congestion; it lasted about five days, and terminated in sudden loss of consciousness, which is but momentary, and left a hemiplegia behind it. Might not one suppose that the simple congestion was succeeded by an effusion of blood? This opinion seemed to derive new support from the absence of all headache, as of all contractions of the limbs. It was also strengthened by the consideration of the remarkable change the pulse underwent some hours before the attack; yet it was simple softening that existed.

The loss of consciousness was momentary, as in several of the preceding cases; but whilst in the latter, different disturbances of intellect followed more or less immediately the return of the patients to consciousness, here, on the contrary, the intellectual faculties remained to the last perfectly sound. The affection of the brain no longer manifested its existence, except by the continuance of the hemiplegia; somnolence even, which preceded the loss of consciousness, no longer showed itself. Was it the influence of the cerebral disease which concurred in the production of the pulmonary œdema of which the patient died? We should be inclined to think so.

We may here say one word of the remarkable lesion of which the heart was the seat, of that partial softening of the parietes of the left ventricle, which contrasted so strikingly with the increase of thickness, which these parietes exhibited in the remainder of their extent.

With respect to the symptoms of the affection of the heart, they certainly are worth remarking, if we compare them with the nature of the lesions discovered in this organ after death. The hand and ear applied over the region of the heart detected no impulse there, notwithstanding the very great disease which existed. The extent of the pulsations was not considerable, though the right and left cavities were very much dilated. There was no obstacle, either at the origin of the aorta, or at the left auriculo-ventricular orifice, nothing, in a word, which could explain the irregularity of the pulsations of the heart and arteries; nothing either, which could account for the extreme smallness of the pulse. This smallness depended certainly less on a material lesion appreciable by the scalpel, than on the manner of the heart's contraction, since it ceased altogether the day the patient was struck with apoplexy. The great fulness of the pulse then, which contrasted so remarkably with its thready state the preceding days, was in some way the precursor of this attack.

This case closes the series of those in which the sudden loss of consciousness was one of the predominant phenomena of cerebral softening. In all the cases which we have cited, loss of consciousness was not the first symptom which announced the affection of the brain. It was preceded by different symptoms, such as pain of the head, dizziness, weakness of the limbs, paralysis, disturbance of the intellectual stupor. These phenomena preceded the loss of consciousness sometimes by some moments only, sometimes by several months. The loss of consciousness itself lasted but for some minutes, or was prolonged for several days. After it, the paralysis which had preceded it was increased; or if this paralysis had not existed previously, it was seen to supervene. In several of our cases the loss of consciousness continued till death; in others it ceased a longer or shorter time before the last moment; and then sometimes the intellect reappeared in all its perfection, either for a continuance or temporarily; sometimes the patient recovered his senses only to fall into a delirium, which a little after terminated in a state of coma.

ARTICLE II.

SOFTENING OF THE BRAIN, WITH WEAKNESS OR PERVERSION OF THE INTELLECT.

CASE 26.—Apoplectic attack for years before death—Complete recovery—Hemiplegia supervening suddenly after some days of violent headache—Delirium.

THIS was the case of a man seventy years of age; the precursory symptom was an acute pain in the left side of the head, and painful numbness in the right hand, and staggering in his gait. After a fortnight, he was found one morning in a lethargic sleep; on awaking he was delirious, unable to articulate, and had hemiplegia of the right side. The latter diminished gradually, but the delirium con-

tinued till he died, which was thirteen days after the lethargic stupor was observed.

The morbid appearances discovered after death were very inconsiderable, considering the symptoms; on the level of, and external to the *corpus striatum* of the left side, there appeared a reddish spot the breadth of a quarter of a dollar. Here the tissue of the brain was quite soft, and looked as if some red colouring matter were mixed up with it. The left ventricle of the heart was hypertrophied.

Case 28.*—Delirium—Contraction of the limbs of the right side—Coma—Red softening of one of the hemispheres—Acute hydrocephalus—Dryness of the arachnoid.

A man, nineteen years old, fell from a height of five or six feet, about fifteen days before his admission to the *Maison de Santé.* No bad symptom resulted at the moment; but a few days after, he felt uneasiness, general lassitude, and occasional shivering. A week after he felt pain of the head, and soon became delirious. He was bled, and had leeches to the epigastrium; delirium and fever still continued. Four days after the latter symptoms appeared, he was admitted to the *Maison de Santé;* he then presented the following state: — Rapid alternations of coma and agitation; face injected; flexion of the right upper extremity; the hand also flexed on the forearm of this limb, and the forearm on the arm; pulse ninety-six; respiration stertorous; tongue moist; abdomen soft (twenty leeches on each side of the neck, a blister to the nape of the neck, sinapisms to the lower extremities, some purging mixture).

Next day, continual coma; vision gone; pupils moderately dilated; frothing at the mouth; face injected; strong flexion of the upper extremity; right leg equally flexed on the thigh; occasionally some convulsive movements in the flexed upper extremity; cutaneous sensibility of both sides of the body destroyed; respiration very stertorous; pulse 140 (ice to the head, sinapisms to the lower extremities, twelve grains of calomel).

During the day, state of coma increases; pulse so frequent and small that it cannot be counted; respiration more and more embarrassed, and the patient died in the night.

Post-mortem. — *Cranium.* — Remarkable dryness of the free surface of the arachnoid. Anterior to the left *corpus striatum* was a softening capable of containing a hazel-nut; this softening presented a well-marked tint. The ventricles were distended with an enormous quantity of serum, clear as rock water. The *fornix* and *septum* were reduced to a white diffluent pulp.

Thorax. — A great number of crude tubercles in the lungs: a quarter of a glass of limpid serum in the pericardium.

Abdomen. — Tubercles in spleen, which is dense and small in size; slight injection of the villous coat of the stomach; small intestine pale; red patches in the cæcum and ascending colon.

* Case twenty-seventh omitted, as containing nothing of particular importance—Tr.

Remarks. — Without seeking to establish how far there was a connexion between the fall which had happened to this person, and the disease of which he died, we shall merely observe that the first morbid phenomena occurred immediately after the fall. These phenomena did not at first seem to be the result of a cerebral affection, which was, in fact, a mere febrile disturbance, without any well-marked local symptom. At first, this young man experienced fatigue, and a degree of uneasiness, which constitute the precursor of the most different diseases; but very soon symptoms appeared, which more directly developed the affection of the encephalon. The headache and delirium which complicated the fever, did not, however, yet prove sufficiently that the disease had its principal seat in the nervous centres; for how often do not similar phenomena present themselves as the purely sympathetic result of the affection of another organ, and particularly of the intestinal tube? Such was also the opinion of the physician who first attended this person, since, after bleeding him from the arm he applied leeches to the epigastrium. Again, could these alternations of profound coma, and convulsive agitation which the patient presented on his admission, have afforded us a certainty that the brain was the organ particularly suffering? Certainly not; for, in many cases, these phenomena are referrible to a gastro-intestinal inflammation. The natural appearance of the tongue should be taken, however, into serious consideration, in order to establish the diagnosis: this might afford good ground for our presuming that we had not to do with a gastro-enteritis, or a dothinenteritis, or a typhoid lesion, and if the seat of the evil were not in the primæ viæ, we should conclude that it was in the brain. The flexion of the limbs of one side gave much greater weight to this opinion; for this phenomenon is scarcely ever produced in consequence of a merely sympathetic suffering of the brain. In the brain then the principal seat of the disease was; but what was its nature? Was there simple meningitis? To this inflammation of the cerebral membranes might be referred the delirium and coma, convulsive agitation, and the modifications of the general sensibility, the loss of vision, &c. But this well-marked flexion of the limbs, limited to only one side of the body, seemed to announce a change of the nervous substance itself; if this did exist (and for our part we think it very likely), it could scarcely be anything else than softening of an inflammatory nature. To sum up; there must be in this case meningo-encephalitis. The autopsy warranted this mode of viewing the matter; the red softening of a small portion of the cerebral substance had a very different appearance from those white softenings of which we found numerous instances in the preceding cases. The particular dryness of which the arachnoid was the seat, was certainly not a normal state of this membrane, and we know that in most inflammations there is a period at which the secretions are suppressed. The great quantity of limpid serum which filled the ventricles must also have performed a part in the production of the symptoms. Again, the dryness of a serous mem-

brane could not be an unanswerable proof that it was inflamed. In order that it should cease to exhale its usual fluid, would it not be sufficient, that a great quantity of serum should be suddenly separated from the blood, in other points of the system? Does not this happen in cholera, where, on opening the bodies, several great serous membranes are also found extremely dry? We would conceive, also, that in consequence of this unusual dryness, the organs enveloped by these serous membranes might be embarrassed in their functions, whence might result various symptoms, falsely attributed to an inflammatory state. Nor is it impossible that certain states of the innervation might have some influence in the dryness of the serous membranes. Does not a mental emotion suddenly deprive the buccal mucous membrane of its usual moisture?

Case 31.—Progressive disturbance of the intellect terminating in complete delirium—Hemiplegia—Flexion of the paralysed limbs—Softening of one hemisphere.

An Irishman, thirty-two years of age, of good constitution, has recently undergone treatment for syphilis, when it was observed that his intellectual faculties were weakened, and his memory in particular impaired. By degrees his intellect became so dull, that he could express himself only with considerable difficulty. He was bled without any amendment. His friends then entreated me to admit him into my wards; I saw him for the first time the 12th of May, when he presented the following state:—The patient lay on his back, and answered the questions put to him with great difficulty: he complained of an acute pain in the head without being able to tell its precise seat; pulse eighty-four, and respiration sixteen every minute. Tongue white and moist. (Bled to sixteen ounces.)

The blood drawn from the vein collected into a small clot, surrounded with much serum, without being buffed.

All the night he raved; strait-waistcoat put on him. On the 13th, the agitation of the night succeeded by a state of somnolence; from time to time he opened his eyes, and looked with a stupid air at all around him; answers slow and difficult; he said his headache was diminished; the fingers of the hands, both right and left, were agitated by slight involuntary movements, and there was no other appreciable disturbance in the locomotive faculties than this spasm of the fingers just mentioned; respiration stertorous, as in apoplectic patients; we counted twenty movements of inspiration each minute; pulse sixty-eight instead of eighty-four. (Twelve grains of calomel.)

Vomited severely after taking the calomel; no alvine dejection; raved all day.

The 14th, in the morning, the delirium continued, but calm; he pronounced some inarticulate words, but in a low voice. He constantly held the right arm outside the bed, and gave it different movements, which seemed directed towards laying hold of some object; the right leg was moved also, and he endeavoured to put it outside the bed. Such was not the case with the two extremities of the left side; they remained immoveable along the trunk. When

the skin of these extremities was pinched, it was those of the right side that moved; the expression of the countenance then indicated that the sensibility continued. We raised the left arm and it fell back but slowly; as if still sustained by a remains of muscular action he made no resistance to the movements of flexion and extension which we attempted to make it perform; but the muscles of this limb were agitated by slight convulsive twitches, which resembled a species of undulation beneath the skin. Pulse now ninety-six, and small; twenty-four respirations each minute. (Two blisters to the thighs.)

On the 15th, the left extremities exhibited a rigidity which they had not the preceding day; the forearm of this side was flexed on the arm, and it resisted the efforts made to extend it; we thought bleeding might still be borne; forty leeches were applied to the base of the cranium.

On the 16th, the patient no longer exhibited any signs of intellect; his eyes, usually shut, were opened occasionally, and fixed with a stupid air on some of the surrounding objects; he directed his right arm towards them, which preserved all its mobility. The left upper extremity deprived of motion, was still more flexed than on the preceding day, as was also the left lower extremity: the sensibility appeared more impaired on the left side of the body than on the right; Pulse 128; respiratory movements twenty-four; pulsations of the heart extended over the entire chest; the respiratory murmur everywhere strong and clear; the subcutaneous veins very much swollen; skin, still warm, covered with sweat; constipation.

In the course of the day were observed constant alternation of great agitation and profound coma: he died at midnight.

Post-mortem. — *Cranium.* — Membranes slightly injected. An immense softening in the right hemisphere, commencing at the convolutions of the posterior and middle lobes, and extending in depth to near the base of the brain. The optic *thalamus* and *corpus striatum* both reduced to an unorganized mass. This softening in its entire extent, presents a dull white colour in some points, and yellowish in others; no appearance of anything like effused blood or infiltrated pus. Very few vessels pass through it; those observed in it are but the vessels of the normal state, the tissue of which is still preserved entire amidst the breaking down of the nervous substance. The left ventricle contains a tea-spoonful of reddish serum.

Thorax. — A glassful of brownish serum in the left pleura; considerable infarction of the lungs; some marks of pulmonary apoplexy in the inferior lobe of the right lung; sanguineous suffusion under the pleura of the same side. Heart hypertrophied; parietes of the left ventricle thirteen lines in thickness; those of the right ventricle four lines, and the septum nine lines.

Remarks. — The disturbance of the intellect was for a long time the prevailing symptom, more even than in any of the preceding cases: it even showed itself without the complication of any other

functional disturbance. This disturbance of the intellect was established but imperfectly; it was gradually weakened. At the time we saw the patient, there was not yet any delirium; but it soon manifested itself, not to cease again, coinciding with alternations of violent agitation and profound coma. It was but consecutively to all these disturbances of the intellect, that motion itself began to be disturbed; the first phenomenon which apprised us of it was small convulsive twitches, extending to the two sides of the body. But characteristic symptoms soon appeared; these symptoms were paralysis of the left extremities, convulsive agitation of the muscles of these limbs, then rigidity and ultimately flexion; the latter continued till death. Then the most characteristic sign of softening did not appear till the close of the disease. This softening was one of the most considerable we have had an opportunity of seeing. Did it commence at the convolutions? Was it in consequence of this circumstance that the disturbance of the intellect marked the commencement of the disease?

In this case, as in the preceding, the membranes were not affected. These two cases also resemble each other in this, that in both the softened parts were not the seat of any sanguineous congestions.

If we now direct our attention to the manner in which the different functions of the life of relation were performed, during the course of this disease, the following remarks will present themselves to us. The tongue was constantly in its normal state; a circumstance which, from the very commencement, should lead us to refer the delirium to an affection of the encephalon, and not of the digestive organs; the calomel, administered once in the dose of twelve grains, made the patient vomit, and did not remove the constipation. The pulse, a little accelerated at the time of the patient's admission, became slow on one day; then it became more and more frequent till death. The very day of his death there was remarkable energy in the pulsation of the heart. With respect to the respiration it was less embarrassed, up to the last, than in other individuals; so that no symptom disclosed, during life, the existence of the serious lesions of which one of the lungs was the seat.

We should have observed in the account of the *post-mortem* that there was considerable softening of the mucous membrane of the stomach, which extended to the subjacent tunics. Did this exist during life? Was it not rather a phenomenon which took place after death? With respect to this matter, here is an extraordinary fact; this person and three others were opened within a few days of each other, whilst the temperature was very high. In these four, who died of very different diseases, we found the great curvature of the stomach softened to that degree, that the slightest stretching of its parietes produced a laceration of them. Some days after the temperature fell, and we found nothing similar in the other bodies we opened.

Case 33.—Gradual weakening of intellect and motion—Several parts of the two hemispheres softened.

A man, sixty years old, was attacked, for the last year, with paralysis of the left side, which came on gradually, not preceded by any loss of consciousness. Simultaneously with the paralysis, the intellect became weakened, and he gradually fell into a complete state of childishness; at which time he entered *La Pitié*. After a little his respiration became hurried; fever developed itself; tongue dry; in the inferior lobe of the right lung we detected intense inflammation, which was not removed by bleeding and revulsives; and death soon followed.

Post-mortem. — The right hemisphere of the brain is the seat of two softenings; one in a convolution of its posterior lobe (at the base); the other immediately behind the ancyroid cavity, one inch and a half in diameter: these two softenings present a reddish colour. In the left hemisphere there is a third softening seated in one of the convolutions of the middle lobe (upper surface): this softening presented a reddish tint, like that of the two others; the ventricles distended by a great quantity of limpid serum; pia mater on the convexity of the hemispheres infiltrated with serum equally limpid. This fluid raises the arachnoid, which is separated by it for several lines from the cerebral substance; there is serum also within the great cavity of the arachnoid.

Thorax.— Red hepatisation of the inferior lobe of the right lung.

Remarks. — Here again the intellect and power of motion were weakened gradually, and from the commencement the disease presented the form and course of a chronic affection. The parts of the brain softened were injected in this case. Now, in other cases we have seen this coexistence of hyperæmia and softening connected with an acute form of the disease. The most remarkable circumstance is the number of softened points in the cerebral hemispheres, and also the existence of a small softening confined to a convolution of the left hemisphere, without there being, during life, any lesion of motion in the right extremities.

SECTION II.

RECAPITULATION.

Whilst passing in review softening of the brain under all its forms, both anatomical and symptomatical, the preceding cases have shown us, how difficult, in many cases, is the diagnosis of this affection. The study of these particular facts seems to us to be of extreme importance, by reason of the different aspect under which each of them presents the disease to us. How could a general description point out sufficiently all these individualities? Each fact has really a physiognomy of its own, and requires to be closely examined. In each of them, not only the symptoms vary, but there are similar

symptoms, which are connected together, or succeed each other in the most different manner. Thence result, for one and the same anatomical lesion, several morbid forms which, in a nosological system, might be placed far apart. In some cases there is what is called an attack of apoplexy, with or without loss of consciousness; in others, it is a fever called ataxic; at other times it is a gradual diminution, either of motion only, or simultaneously of intellect and motion. We have seen also how different are the modifications which the latter may undergo; complete or incomplete paralysis, convulsive movements, partial or general, contraction, tetanic rigidity, limited to some muscles, or extending to all the body, &c. How could we attain a perception of all these shades, if not by the study of the particular facts which represent them? And again, some of these will show cases, where not only the softening has no longer the symptoms which ordinarily accompany it, but in which there is not even a symptom which announces any lesion whatever of the nervous centres; so that sometimes the softening of the brain remains a lesion entirely latent. We should not, however, confine ourselves to the mere consideration of these particular facts; we should endeavour to possess ourselves, as far as possible, of the traits by which they differ, those in which they resemble each other, and thus derive from our study of individualities general conclusions. But however extensive these generalisations may be, let us not flatter ourselves that they ever can take in the infinite variety of facts; hence the necessity of recurring to them constantly, and of constantly interrogating observation, which alone can either enlarge or rectify our opinions.

We have seen, in the preceding cases, that softening of the brain is far from presenting itself always on the dead body with the same anatomical characters. These are, at times, so different, that they seem to indicate a difference in the nature of the lesion. There are, first, some kinds, where the only change we can discover in the nervous substance, is a diminution of consistence; it appears that either all at once, or gradually, it returned, in a certain part of its extent, to the almost liquid state which, during fœtal life, constituted its normal state. It has, besides, its ordinary colour; and we may still distinguish, by their different tints, the grey and the white substance. At times, only, we see this softened part pervaded by a certain number of vessels; but their presence is not a pathological state; it is merely the vascular woof of the normal state, which remained entire in the midst of the softened pulp in which it was plunged. But this vascular woof, itself, is very far from being always distinguishable: there are cases where, far from being more coloured than usual, the part which has lost its consistence is, on the contrary, remarkably pale; it no longer contains a drop of blood; its vessels have disappeared. This loss of substance may be appreciated in the grey substance particularly, which, in more than one case of softening, can no longer be distinguished by its colour from the white substance adjacent to it.

This loss of colour noticed by M. Lallemand, was considered by him as the product of an infiltration of the cerebral substance by purulent matter. In several cases there is nothing to prove that it is so. When the softened parietes contain pus, they have a different aspect, and it is easy to recognise it, as we shall presently see.

Here then, already, are two varieties which, in reference to anatomy, should be distinguished from each other. In the first of these the softening is the only morbid element; in the second another is added to it, namely, *a state of anemia;* it is, consequently, an element the inverse of those which constitute inflammation.

Then there comes another variety, frequent, no doubt, but much less so than has been said: it is where a state of *hyperemia* complicates the softening. The portion of nervous substance, which has lost its consistence, presents different degrees of injection, whence results a red colour of more or less intensity. Sometimes this red tint is general; sometimes it is scattered in points, more or less approximated, through the entire extent of the softening. In place of this simple injection, it may happen that we find within the softening real effusions of blood, variable in size and number.

Instead of being penetrated by a superabundant quantity of blood, the softened part may become the seat of a morbid secretion, which is sometimes simply serous, and sometimes purulent. In the first case, we find the nervous pulp soaked, as it were, in a more or less turbid serum, which holds suspended whitish or greyish flocculi, the only fragments of the cerebral substance which have still preserved any consistence. In the second case, pus of different qualities infiltrates the softened parts, or else unites into cavities, and forms abscesses more or less considerable.

Do these different appearances, which may be presented by a softening of the brain, refer to lesions of a different nature? Are they but degrees, more or less advanced, of one and the same disease? It is easy to prove that, in a considerable number of cases, it is first injected, then softened, then secretes pus. This has been excellently well established by M. Lallemand. The softening is then one of the anatomical characters of inflammation of the brain, as it may be of all other organs. But if, in other cases, we do not find within the softening any trace either of sanguineous injection, or purulent infiltration; if we find, in a word, no other alteration but softening itself, will it not be an abuse of analogy to conclude that in these cases also, the cause which has deprived the brain of its consistence is inflammation? *A fortiori*, will not one be induced to admit it in those other cases where the softened part has become, at the same time, the seat of an anemia? We should note, besides, that among these cases of white softening, there are some which have formed very rapidly, after the manner of acute diseases, and in such cases it cannot be supposed that the softening has commenced by a sanguineous congestion, which would disappear, according as the affection would assume a chronic course. No doubt, those who refer the proximate cause of every disease to

a defect of the normal stimulation, must necessarily make cerebral softening enter into one or other of these states, and not finding in this alteration the characters of an asthenic disease, they must regard it as an inflammation. In thinking so, they but follow their theories. But for us, who believe that in a crowd of morbid states, there is no more hypersthenia than asthenia, but mere perversion of the vital actions, we are no more obliged to consider the cerebral softening, or any other softening, as an inflammation, than tubercles as pneumonia. It is a specific alteration of nutrition which may supervene under the influence of morbid conditions widely differing from each other. To endeavour to determine these different conditions is the task to be performed; a task difficult, no doubt, but of quite another importance from that on which medical men have occupied themselves in latter times, when they have wished to reduce every cerebral softening to one of the forms, or one of the degrees of inflammation of the nervous centres. We are convinced that by proceeding thus they have entered on a course diametrically opposite to that which should lead to the truth. We, too, might collect groups of facts to demonstrate that softening is capable of being produced by different causes of inflammation. Thus, we might find one group of facts from which it would result that commencing obliteration of the arteries which enter the brain, is one of the conditions that concur in the production of a certain number of softenings. We might cite other facts which would show us a remarkable coincidence between the *impoverishment* of the blood, or any other alteration whatever of this liquid, and the softening of a great number of our tissues. Are there really so many causes of softening? Time will decide, and will discover, no doubt, many other causes, which in the present state of our knowledge we cannot even suspect. All that we affirm is, that it is necessary to seek elsewhere than in inflammation for the cause of all softenings. It does not even seem to us that the presence of an unusual quantity of blood in the midst of a softened tissue, is a sufficient proof that irritation is the cause of its softening. May it not be that this superabundant blood has flowed into these softened parts but consecutively? We see the case where after a limb has remained for a long time merely paralysed, it suddenly became rigid, convulsed, and contracted; on opening the body, we often find, in such cases, one part of the brain softened, and at the same time reddened with blood. Reasoning may lead us to admit here, that the sanguineous congestion occurred but as a mere complication of softening, and that it is it which caused the phenomena of excitement to succeed the simple loss of motion. In order to explain a cause which simultaneously softened and reddened a tissue, shall we never see anything beyond the mere fact of an irritation which has acted on this tissue? Is it then in the gums of a scorbutic subject that the cause resides, which has brought them at the same time to a state of hyperemia, and deprived them of their consistence?

Here, no doubt, are very many questions raised, which wait till

facts rigorously observed shall come to solve them. But it is enough, we think, that such questions can be put, and that in the future progress of science their solution is possible, to make one mistrust very much the opinion which refers every softening to an inflammation. Because the brain is softened after a blow on the cranium, is that a reason for saying that every time it shall have lost its consistence, it must have been previously irritated?

If science refuse to admit inflammation as the sole cause of softening of the brain, if it see in this softening several other causes, for the proof of which it waits for new researches, it is quite clear that the term encephalitis cannot be used as synonymous with the word softening. Neither do we think it correct, to call this alteration capillary apoplexy, as M. Cruveilhier has done. In a certain number of cases, to be sure, the softening is accompanied or rather complicated with sanguineous infiltration, or effusions of blood more or less multiplied; but certainly it is not in the presence of this blood that the essence of the disease consists, and there are at least as many causes in which we do not find the least trace of it. The softening then may be either a capillary apoplexy, or an encephalitis; but it is not necessarily either the one or the other.

Outside the softened parts, the brain and its membranes do not always present the same conditions. The substance of the brain has ordinarily its usual consistence; there are cases where it is perceptibly injected; at other times it is not so; at other times it is even paler than usual. It may also be tumefied and increased in size; then the hemisphere where the softening exists presents a singular appearance; its convolutions are, as it were, heaped one upon another, and there are cases where, passing the median line, it acts upon and compresses the hemisphere of the opposite side.

There are other cases where persons affected with softening of the brain, which has already lasted for a considerable time, have died of hemorrhage which took place in another point of the encephalon; an instance of this has been given. With respect to the investing membranes, they often have their physiological appearance; in several of the cases we have cited, the pia mater was traversed by numerous vessels; in others a limpid or slightly turbid serum infiltrated it. The ventricles presented to us more than once a considerable dilatation, the result of the great quantity of limpid serum which filled them.

These different alterations of the nervous substance, or of its membranes, certainly perform their part in the production of the symptoms which accompany softening of the brain; they may precede it, be developed simultaneously with it, or only a longer or shorter time after it. The injection of the pia mater, its infiltration by a turbid or transparent liquid, may be general; but we have seen cases where these changes were partial; they were limited to the parts of the membranes extended over the points of the brain which had lost their consistence.

There are cases where the most apparent lesion is that of the

meninges: in some cases the softening affects only the superficial layer of the convolutions; we must then raise very cautiously the pia mater in order to ascertain this softening: in such cases, portions of the cerebral substance are detached with the membrane. In certain cases of chronic meningitis, the softening does not exist immediately beneath the pia mater; it occupies the deep plane of the convolutions, whilst their superficial plane remains in its normal state, or is indurated.

In what state are the different organs found in individuals who have died with softening of the cerebral hemispheres? This question is important, whether we wish to establish what are the alterations which this softening may induce in other parts, or whether we wish to seek what are the conditions of the system which most frequently precede softening of the brain.

Only one organ seems to us to receive a direct influence from the cerebral lesion; that organ is the lungs. We have been struck, in our *post-mortem* examinations, with the great serous congestions of which the lungs were frequently the seat. It is of the affection of this organ, also, that several individuals die who are affected with cerebral softening. It is to the state of asphyxia in which they die that we must refer the bright redness presented in them by the gastro-intestinal mucous membrane. If we re-peruse, on this subject, the cases already quoted, we shall find accordingly, that the cases in which the lungs has been found, after death, most infarcted with serum, are those where we have met most intense hyperemia in the mucous membrane of the intestinal tube; but this hyperemia was altogether mechanical.

With respect to the organic lesions which existed before the softening, we have met a certain number. We shall present a view of them.

In twenty-one cases the heart presented no appreciable lesion; in nine cases it was aneurismatic; in one case the aortic valves were ossified; in two other cases the heart itself presented no alteration, but the two layers of the pericardium adhered closely to each other by old cellular adhesions. In one of the subjects, whose heart was hypertrophied or dilated, there was at the same time aneurism of the aorta.

The blood did not, in any case, present particular qualities. The lungs were sound, or merely œdematous, in eighteen cases; they were melanosed at their summit in one case; they contained tubercles in seven cases, and cretaceous concretions in two cases; twice they presented traces of recent inflammation (red or grey hepatisation); and other three times we ascertained the existence of pulmonary apoplexy. In the two subjects where this apoplexy was met with, the heart was hypertrophied and the lungs infarcted; in one of them we observed, in the sub-pleural cellular tissue, well-marked sanguineous suffusion.

The digestive organs were found exempt from all appreciable lesion in fourteen cases; five times they were injected in different

points of their extent; in eight individuals the mucous membranes of the stomach had that brown or slate colour hue which is one of the anatomical characters of chronic gastritis; in two cases the stomach was the seat of a cancerous affection; in the subject of the second case, the cancer existed also in the liver and kidneys; the stomach presented greater or less softening, either of its mucous membrane alone, or of all its tunics in three cases. Finally, we found ulcerations in the intestines in three individuals whose lungs contained tubercles.

The liver presented no perceptible alteration, except in four cases; it was cancerous in two subjects (cases 2, 3); there was cirrosus of it in a third, who had, at the same time, ascites (case 9); and, in a fourth, it underwent the fatty degeneration (case 10).

In one case, in fine, we found numerous tubercles in the lungs, liver, spleen, kidneys, intestines, and, at the same time, there were some in the pia mater, pleura, and in the peritoneum (case 25).

In the subject of case 28th, there were at one and the same time tubercles in the lungs and spleen, without there being any in the intestines.

It follows, from the account which we have just now presented, that among the thirty-three individuals, whose history we have given, there were but very few whose organs were all sound at the time their brain was affected with softening.

The cerebral hemisperes are not softened with equal frequency in the different points of their extent. On analysing with respect to the seat of the softening, on the one hand our own thirty-three cases, and on the other hand 117 cases published by different authors, and in which the seat of the lesion was precisely indicated, we found as follows:—

	CASES
Softening of the whole hemispheres	4
——— of only one hemisphere in almost its entire extent	13
——— of the convolutions alone	14
——— of the convolutions and other more deeply-seated parts	9
——— of the anterior lobes	27
——— of the middle lobes	37
——— of the posterior lobes	16
——— of the *corpora striata*	28
——— of the *optic thalami*	15
——— of the parietes of the ventricles	2
——— of the cerebral peduncles	1
——— dispersed through different points	5

It has been said, that, in these different parts, the grey substance was more frequently softened than the white. We do not think this opinion sufficiently proved. In the softenings which occupy the nervous mass situated above the ventricles, there is certainly much more of the white substance engorged than of the grey, and the preceding table shows us that these softenings are very frequent. In the cases of softening of the *corpora striata*, it is not their external grey cortex that is most frequently affected; so far from it, that this is most usually sound, and the softening exists in its inte-

rior, and then both the grey and white substance are found equally deprived of consistence; the convolutions, where much grey substance exists, are far from being the parts most frequently softened. In several of the cases, the softening commences immediately beneath them, thus leaving the grey substance untouched, and attacking the white exclusively. In consequence of the greater quantity of vessels contained by the grey substance, the frequency of its softening might become a further argument to be adduced in favour of the opinion of those who admit, that every softening is preceded by an inflammatory congestion; we may now judge of the weight of this argument.

The two cerebral hemispheres are softened with nearly equal frequency; we may satisfy ourselves of this, by looking at the following table, which results from the analysis of our thirty-three cases, and of 136 other cases borrowed from different authors. In all these cases, the softening was produced spontaneously, and we have not taken into the account those in which the brain lost its consistence in consequence of external violence, or a disease of the bones.

In these 169 cases the softening took place —

	TIMES
In the right hemisphere	73
In the left hemisphere	62
In the two hemispheres at once	33

Most frequently we find in a hemisphere only one point softened; sometimes, however, we meet several of them separated by intervening spaces, in which the cerebral substance has its normal consistence. We have given some cases of this kind.

With respect to the extent which the softening may occupy, it is very variable: it may attack the whole of the two hemispheres, occupy only the whole of one, be confined to one lobe, to a portion of this lobe; and, in fine, at the other extremity of the scale we find cases in which a hazel-nut could scarcely be contained in the space occupied by the softening; and yet serious symptoms have been produced by a lesion so circumscribed. Now, we may conceive the production of these symptoms in several ways; we may attribute it to the mere fact of disorganisation of the softened parts, or to the irritation felt by the rest of the encephalon, an irritation which sometimes evinces itself in the dead body by different lesions, and sometimes leaves, after death, no trace of its existence. The hemisphere opposite to that in which the softening is, may be affected also in a manner altogether sympathetic, and it is thus we may conceive general disturbances of motion and sensation, connected with a softening which occupies but a very circumscribed point of one of the hemispheres.

There is no period of life in which cases of cerebral softening have not been observed; its existence has been ascertained in mere infants, and in persons eighty-nine years old.

We cannot make use of the cases which have been published on

softening of the brain, in order to deduce from them the medium of the age of individuals most liable to it. To do this, in fact, it would be necessary that the same task which was performed by M. Rostan at the *Salpêtrière*, should be undertaken, for example, at the *Hôpital des Enfans.*

Passing over then the very small number of cases published up to the present day, on softening of the brain in children, and comprising in our analysis only the cases of individuals of from fifteen years old and upwards, we found that out of 153 cases of softening, the ages were distributed as follows:—

	CASES		CASES
15 to 20 years old, -	10	55 to 60 years old, -	18
20 to 25 - - -	9	60 to 65 - - -	8
25 to 30 - - -	9	65 to 70 - - -	26
30 to 35 - - -	6	70 to 75 - - -	19
35 to 40 - - -	5	70 to 80 - - -	11
40 to 45 - - -	9	81 - - -	2
45 to 50 - - -	10	87 - - -	1
50 to 55 - - -	9	89 - - -	1

Thus, from the age of fifteen to forty we find, in this table, but thirty-nine individuals who have had softening of the cerebral hemispheres; from forty to sixty-five, we find fifty-four; and from the age of sixty-five to eighty-seven years, there are sixty. The age which gives us the highest number is the period of life included between sixty-five and seventy-five years.*

With respect to the period of life comprised between birth and the age of fifteen years, cases are not wanting to show that, even during that time, the cerebral hemispheres may also be softened. Billard, in his work on the Diseases of New-born Children, has mentioned cases of fœtuses, which, on coming into the world, or a very little time after birth, presented a softening of the brain either partial or general. Other cases of softening of this organ have been published, in subjects of the age of one year, three years, four years, five years, nine years, twelve years, thirteen years, fourteen years. One of the most remarkable cases of this kind is that for the knowledge of which we are indebted to Dr. Deslandes. In this case, of a child of three years old, all the substance of the brain, cerebellum, and pons, were reduced to such a state of softening, that it could not be touched without being destroyed; this substance presented no trace of injection; there was not a drop of serum in the ventricles; the pia mater was red.

It has been stated that, in an anatomical point of view, softening of the brain in old men differed from softening of the brain at other periods of life. From our researches on this subject, it results, that softening not complicated with hyperemia is more frequent in old

* The data on which we drew up this table are:—1st, Our own 33 cases; 2d, 40 cases of M. Rostan's; 3d, 36 from M. Lallemand's work; 4th, 10 published by M. Bouillaud; 5th, 45 which we found in different periodical works.

age; but it is also found at all other ages, and it is far from being rare in infancy. At the time we were collecting some cases at the *Hôpital des Enfans*, we remember to have found many times several parts of the brain reduced to a soft consistence, without these parts being in the slightest degree injected. We have met in particular a complete softening of one of the optic *thalami*, without its colour being at all affected.

Is the one sex more disposed than the other to softening of the brain? This question might be easily solved, if an exact account were kept for some years of the number of cases of this disease, observed at the *Bicêtre* and the *Salpétrière*. In the published cases, we found more females than males; but this may be owing to the circumstance of there not having been performed at the *Bicêtre*, a task similar to that performed at the *Salpétrière* by M. Rostan. Let us pass by then the cases of the latter physician, they being all connected with females, and let us see what information we may derive from other cases collected indiscriminately in subjects of both sexes.

In the cases we have cited, there are more males than females; twenty of the former, thirteen of the latter. But it must be observed that a considerable number of these cases were collected in a hospital (*La Charité*) where male patients were in much greater number than females. The numerical result might then only lead us into error, if we do not take into account the circumstances under which it was computed. In 116 cases, published by different writers, in which the sex was noted, we found that there were forty-seven males, and sixty-nine females. But here again, it would be necessary to know, in what proportions the individuals of the two sexes were distributed in the hospitals in which the cases were collected.

Except the cases in which the softening of the brain succeeds to external violence on the cranium, the circumstances under the influence of which it is produced can be but very seldom ascertained. In some it comes on in the midst of perfect health; in others it is formed during the progress of different chronic diseases, without our being able to assert that the latter perform any part in its production. Without dwelling longer on this so obscure point of the history of softening of the brain, let us now proceed to consider the different symptoms which during life indicate its existence with more or less certainty.

The intellect, motion, sensation, undergo, in consequence of softening of the brain, different modifications, which we shall now detail.

The state of the intellect is far from being always the same. In the first place there are cases, and very many cases, in which it preserves all its integrity. At other times the intellectual faculties are completely abolished from the commencement of the disease: this happens when the latter commences by a sudden loss of consciousness, or by a state of coma; after a time, which in general is variable, the intellectual faculties are re-established, sometimes entirely,

which is rare, sometimes only in part, and then the individual has his intellect dull and impaired until death.

In a third case the intellect never entirely disappears; but either from the commencement, or subsequently, it undergoes a perceptible weakening, which continues to the last. The persons thus circumstanced have, as it were, a stupid air; some present that air of stupor which, to a certain extent, is one of the characters of typhoid fever; their answers are slow and uncertain; they have but little memory, little connexion in their ideas; they seem also to have but few wants: they appear sunk in a sort of idiotism, or state of infancy: several present a state of almost continual somnolence. In some this drowsiness is the prevailing phenomenon during the entire course of the disease.

Lastly, we have adduced several cases, in which the intellect was disturbed to such a degree as to give rise to delirium. This may manifest itself only at intervals, or exist continually. In some patients the delirium appears from the commencement; in others it comes on only at a more or less advanced period of the affection; we occasionally see it alternate, either with intervals of reason or with a state of coma.

In some subjects the form of the delirium is such, that there is observed real mental alienation.

These different states of the intellectual faculties may show themselves one after the other in one and the same individual.

With these different modifications of the intellect speech may be perserved, or else be entirely lost. Among the cases which we have cited, some refer to individuals who, though appearing to have all their intellect, were absolutely unable to articulate a single word.

We have seen some cases, and authors also mention others, in which the intellect, lost or perverted during the entire course of the disease, suddenly resumed remarkable clearness some hours before death.

Are these different states of the intellect connected with the nature, seat, or extent of the cerebral lesion? or, in the present state of our knowledge, can they be explained only by a peculiar disposition of the nervous centres which, with a lesion altogether identical, are capable of undergoing functional modifications of the most dissimilar kind? We shall see how far observation will inform us on this subject.

Let us first inquire what are the anatomical conditions in which the encephalon is found in the individuals whose history we have detailed, and let us ask ourselves whether any connexion can be established between these different conditions and their intellectual state.

Sixteen subjects, that is, nearly half of our patients, presented no disorder of mind at any period of their illness. Among them, however, is one (case 11) who the last day of his life fell suddenly into a state of coma, in the midst of which he died. In these sixteen cases, we ascertained in the encephalon and its appendages the following state: —

In six patients the meninges were pale, of normal consistence, and no liquid infiltrated them. In six others the arachnoid covering the convexity of the hemispheres was separated from them by a limpid serum situated in the pia mater; the serum was small in quantity, except in one case (case 3), where the ventricles were at the same time filled with a quantity of serum sufficient to distend them; in another subject, some serum infiltrated the pia mater of the upper surface of the brain, but it was turbid: this was in the individual in whom the coma supervened on the day he died. In two cases only this membrane was injected, and in one case the arachnoid and pia mater were changed into a dense opaque tissue, as serous membranes are, or rather the cellular layers which line them, when chronic inflammation has attacked them (case 4). This morbid state of the meninges was confined to the portion of the cerebral substance affected with softening.

In none of these sixteen cases did the brain present any alteration outside the softened parts, except in the subject of the eleventh case, who had coma on the last day, and in whom the hemisphere, not softened, presented in an accurately circumscribed point a very bright injection.

In these sixteen cases the softening itself was found thirteen times whitish or greyish, as the cerebral pulp should be; three times only it presented a complication of hyperemia.

From considering what has been already detailed, we find that our cases of softening, where there was disturbance of intellect, did not differ materially from the cases where the mind remained sound, either with respect to the state of the meninges, or the state of the brain itself, considered externally to, and within, the softening. Thus, the presence or absence of disturbance of intellect, in cases of cerebral softening, seems to depend much less on the nature of the alterations discovered after death, than on the mode peculiar to each subject, according to which the irritation extends itself from the softened parts to the rest of the encephalon; the traces of this irritation are not such as the scalpel has been as yet able to discover. Thus, then, the infinite variety of the symptomatic forms of a disease can no more be explained, in many cases at least, by the different conditions in which the organ which is the seat of them is found, than we can account by the anatomical differences in a part for the different modes according to which, in each individual, one and the same function is performed.

Thus then we find, as well by our own observation as that of others, that softenings of the brain, most different in their seat, extent, and even in the state of the surrounding parts, may, with equal readiness, be accompanied by disturbances of the intellect.

With respect to the cases in which the mind is always preserved or promptly recovered, we shall fine these to be equally with and without lesion of the periphery of the brain.

The disturbance of the intellectual faculties can no longer be regarded as more particularly connected with softening of the ante-

rior or posterior lobes, as some have asserted. Numerous facts prove that the lesion of these different lobes is equally followed by delirium or any other disturbance of the intellect.

In the case where the disease commences by complete loss of consciousness, the softening occupies in general a great extent, as a great number of facts prove. And yet, in some cases of this kind, softenings have been found by no means extensive considering the severity of the symptoms.

From numerous cases we feel warranted in laying it down, that it is impossible to establish rigorously, from the existence or nature of the functional disturbance, the seat and extent of the softening.

Of the different mental disorders which may accompany softening of the brain, there is not one which, by its specific form, can suffice to point out during life the nature of the alteration affecting the encephalon. Simple injections, either of the meninges or nervous substance itself, considerable accumulation, either around the brain or in its ventricles, hemorrhage which has lacerated its substance, accidental products therein developed, may, in fact, equally produce, either delirium with all its varieties, or mere weakness of intellect, or sudden loss of consciousness.

In some of the subjects, whose cases we have recorded, one of the most prominent phenomena was loss of speech. The facts which we have recorded on this subject, tend to prove that the efforts made at different periods to assign to certain parts of the brain the faculty of articulating and arranging language, are, at least, premature. We already discussed this question when on the subject of cerebral hemorrhage.

Softening of the cerebral hemispheres induces alterations in motion much more constantly than in intellect. Even this rule is not, however, without its exceptions, and we have cited some cases in which we did not observe, in reference to motility, any appreciable modification. In the four cases of this kind which we have recorded, the softening occupied the most different seats. One time it was limited to some convolutions of the convexity; another time it occupied, at the base of the anterior lobe of one of the hemispheres, a space large enough to contain a pullet's egg. Two other times it occupied several points of the two hemispheres (cases 1, 2, 3, 4). Several cases, however, are on record, in which softening of the brain existed without any disturbance of motion having been observed.* When this does happen, it is probable that the softening takes place very slowly. Such cases remind us of those in which the brain, subjected to a gradual compression by tumours developed around it, or in its substance, does not announce its suffering by any paralysis or other disturbance in locomotion.

When motion is affected (and this case may be regarded as nearly constant), it is very far from being always affected in the same way.

* See Repertoire d'Anatomie et de Physiologie Pathologique, par Breschet, tom. i. p. 116, also Journal Hebdomadaire, tom. iv. p. 270.

It has been laid down much too generally, that softening of the brain produced, in the greater number of cases, a flexion (*contracture*) of the limbs. Observation has satisfied us that this flexion may be as often absent as it is present; but it is very true, that when it does occur it becomes an excellent sign to distinguish a softening of the brain from every other affection of this organ. Let us not, however, regard such a sign as pathognomonic; for it has been found in other cases where there was no softening. It has been often noticed, for instance, in the cases of congenital atrophy of the brain, published by MM. Bouchet and Casauvieilh (*Archives Générales de Médecine*, tom. ix.).

The modifications which motion undergoes in cases of softening of the brain, are far then from being always of the same nature. These modifications most usually consist either in simple paralysis, flexion of the limbs, or in convulsions. There are other cases then in which motion is modified in quite a different way: we shall return to that subject presently.

Paralysis presents differences with respect to its degree, its progress, and its seat.

There are cases where it comes on but gradually. The patients perceive that one of their extremities has less strength than the other; one of their hands can hold objects less strongly than the other; they feel an awkwardness in using it; one of their arms appears insensible to them, or their leg drags a little in walking. This commencement of paralysis may remain stationary for a long time; then it is seen progressively to increase; or else it becomes all at once more considerable.

In other cases the paralysis does not pass through these different degrees; it comes on suddenly, and, from the first moment of its appearance, it is as complete as possible; it bears the greatest resemblance to the paralysis resulting from an effusion of blood into the brain.

When the paralysis is established but gradually, it shows itself only on one side of the body, unless the softening itself exist in the two hemispheres. When it suddenly acquires its highest degree of intensity the case is the same, at least in the greater number of cases. Sometimes, however, it takes place on the two sides, though the softening may not be double; but that scarcely happens except when on the side where it has occurred the softening may be very considerable. Then two things may happen: either the general paralysis continues till death, which soon takes place; or else, at the end of a certain number of hours, the movements of one side again become free, and there remains but hemiplegia.

The flexion (*contracture*) presents in its different degrees, in its mode of appearance, in its progress, and its seat, the same differences as simple paralysis. As the latter, it may come on slowly, and increase in quite a gradual manner. Thus we see some individuals in whom the flexion continues for a long time confined to one single phalanx, or to one finger; then it extends progressively to the other

fingers, to the entire hand, and finally to the forearm; the same progression takes place for the lower extremity. Once established on one of these points, it does not continue there always: there are some hours, and even some days, when it disappears to reappear again. In its absence, sometimes, the parts which were the seat of it recover the entire freedom of their movements; sometimes they are weak, benumbed, on the road to paralysis, or finally they continue really paralysed.

The flexion (*contracture*) may also, as well as the paralysis, come on suddenly, and attain at once its maximum of intensity. It is by a violent flexion of one limb, or of the two limbs of one side, that a certain number of cerebral softenings actually commence. Under this form, the flexion indicates the nature of the disease with much more certainty than when it is established gradually.

Once produced, the flexion may continue, becoming either more and more intense, or diminishing, or remaining in the same state. But it may also disappear; there are cases, for instance, where it lasts only some hours; there are some where it ceases at the end of an extremely short time, where it shows itself for scarcely a few minutes; and is then succeeded by simple paralysis. After disappearing, it sometimes does not show itself again; sometimes it returns at certain intervals.

Besides paralysis and flexion, softening of the brain may produce convulsive movements, which take place, as other lesions of motion, on the side of the body opposite to the softened hemisphere. There are some cases where these convulsions mark the commencement of the disease: they cease after a longer or shorter time, and are succeeded by paralysis or flexion; at other times they come on at a later period, and replace momentarily the abolition of motion.

Instead of being confined to one side of the body, the convulsions may be general, either every time they show themselves, or only from time to time. In the second case, it has happened more than once that there has not been found in the hemisphere opposite to that where the softening has taken place any lesion which could account for this momentary generalisation of the convulsive movements. In the cases, on the contrary, where the convulsions remain always general, we have been able almost always to discover lesions in the two hemispheres, or around them.

We have now considered the great modifications which motion undergoes in cases of softening of the cerebral hemispheres. With respect to the parts of the body in which the power of motion is injured, they vary, for cerebral softening as well as for cerebral hemorrhage; and we refer to our observations on this last affection for all the questions regarding the determination of the seat of the paralysis, or of any other disturbance of motion. Only we would here observe that, among the cases of softening which we have detailed, there are several which seem to us to form a very strong objection to the opinion of those who thought they discovered in the brain the particular parts which preside respectively over the

motion of the upper and lower extremities. Very probably, those particular parts do exist, since each limb may be separately convulsed, paralysed, &c., but it appears to us that these particular parts are yet to be found out, and we know nothing which can be so adverse to the sound doctrine of the localisation of the cerebral functions, as those premature attempts which some persons have been inclined to make in latter times.

There are some rare cases in which the softening of the cerebral hemispheres gives rise to disturbances of motion, different from those of which we have hitherto spoken. Thus, in some individuals there have been observed symptoms of tetanus, either partial or general; in others, of epilepsy.

Disorders of sensation have also their importance, when it is an object to establish the diagnosis of softening of the brain. These lesions may be seated either in the head itself, or in other parts of the body. The head is often the seat of a pain, to which we must first direct our attention.

This pain, which has been remarked by all observers, shows itself in a considerable number of cases; but it is far from being constant, as may be seen by perusing the cases already cited.

When it does exist, it shows itself most frequently at the commencement of the disease; it may then precede all the other symptoms, and continue single for a certain time; we have recorded cases, in which individuals were attacked with headache for fifteen days, twenty-five days, and even more, without presenting any other derangement in their health. Ordinarily, this precursor, marked by headache alone, lasts a shorter time, from some hours to five or six days.

There are other cases where, from its commencement, the pain of the head is accompanied by divers phenomena; but sometimes they are not yet of the number of those which may serve to indicate it. Thus, in some of our patients we have seen the pain of the head complicated, from the moment of its appearance or soon after, with dizziness, vertigo, *tinnitus aurium*, unusual redness of the eyes and face: these symptoms announced nothing yet but mere cerebral congestion. But on other occasions, at the same time that the pain of the head comes on, it is complicated either with a diminution in the activity of the intellectual faculties, or some lesion of motion. The latter may be so very inconsiderable, that the patients themselves do not call the attention of the physician to it, their whole attention being taken up with the pain of the head.

Once come on, the headache may continue with variable degrees of intensity; but it often ceases, according as the lesion of motion becomes more marked. Many patients, who still retained all their intellect, have assured us, that, at a certain period of their complaint, they no longer felt the slightest trace of the pain of the head, which at first had occasioned them so much anguish. We must not suppose, however, that the headache no longer exists in those persons who cease to complain of it: it seems to continue, for instance, in several

patients who, sunk in delirium or coma more or less profound, continually apply the hand that remains free towards their head, and even towards a particular part of the head. At other times, when their intellect is as yet only impaired and blunted, and they happen to be asked whether they feel pain any where, it often happens that at first they make no reply; but if they are pressed, they slowly apply the sound limb to the head, and in several cases it is to the side opposite to that the motion of which is injured. This sign, as has been already remarked by Professor Rostan, is of the greatest importance; it suffices almost singly, adds this learned observer, to characterise ramollissement.

The cerebral substance which may be cut and torn in living animals without their manifesting any feeling of pain, is then capable, as well as several other tissues, of becoming very sensible in the morbid state. It is not here as in inflammation of the lung, which is not accompanied with anything of acute pain, except when the pleura itself is irritated. In the cranium also, the acute or chronic inflammation of the serous membrane is accompanied by a pain, the history of which we have traced in another part of this volume; but this pain manifests itself equally in cases where the membranes have continued perfectly sound, in those very cases where the softening is produced at a considerable distance from the periphery of the brain. Thus it is the cerebral pulp itself that becomes painful. But why are these cases completely identical with respect to the seat and form of the softening, which differs, however, with respect to the pain, which is absent in one of the cases and present in the other? That is a question which cannot be solved in the present state of science. Let us remark only, that the same difference is found to exist in all the other organs, and that the most painful diseases may sometimes present themselves altogether free from pain; thus we have seen large purulent effusions into the peritoneum, suffer us, however, to press the abdominal parietes forcibly, without any painful sensation resulting from it.

The headache produced by softening of the brain has not always the same seat: sometimes it is diffused over the entire head, and cannot in any way indicate the point where the disease exists; sometimes it shows itself, to be sure, in a circumscribed place, but this place does not correspond with the softening. Thus, with several patients the forehead alone is painful, though it may be far from being that region of the brain which had lost its consistence. But observe that in a number of different affections, whether of the brain or of other organs, when suffering reacts upon it, it is also towards the forehead that the pain is felt. This would seem then to be a sort of place of election for giving notice to the sensibility, wherever else the seat of the lesion may be placed. Sometimes, in fine, the pain of head is exactly limited to the point of the parietes of the cranium corresponding to the softened portion of the cerebral pulp.

With respect to the intensity of the pain of head, it is very variable; some patients complain but of a weight, a sort of constriction either diffused over the entire cranium, or fixed to one point. In others, again, the pain is more acute.

Whether pain of the head exists or not, different parts of the body may present in their sensibility several modifications. Sometimes it is diminished or abolished, sometimes, on the contrary, exalted. The diminution or abolition of sensibility is remarked particularly in the skin covering the paralysed limbs. In most cases this happens only when motion is already altered; but there are individuals however, in whom, a long time before the appearance of the symptoms characteristic of softening, the extremities of the fingers of one of the hands, or of the toes of one of the feet, become numbed, or cold, or are the seat of annoying formications; then, in proportion as the lesions of motion become established, the sensibility diminishes more and more, and is finally extinguished altogether.

Increase of the sensibility is again among the number of the phenomena frequently produced by softening of the cerebral hemispheres: it may be seated solely in the skin, or in parts situate beneath the skin.

Most frequently the exaltation of the cutaneous sensibility does not extend beyond the parts in which motion itself is altered. The skin here becomes at times exquisitely sensible, so that the slightest pressure produces the most acute pain, and sometimes, occasions convulsive twitches in the limb affected.

With respect to the functions of organic life, the digestion is, in general, not disturbed; the tongue preserves its natural appearance with regard to its colour and moisture; vomiting is but seldom seen to supervene. In some cases, when the softening follows a chronic course, signs of gastro-intestinal irritation, more or less severe, are seen to occur, which soon throws the patient into a profound coma, and accelerates his death.

The circulation is far from being always modified in the same manner in individuals affected with softening of the brain. The pulse is in general accelerated, sometimes, however, it retains its physiological state. We may deduce, however, from a careful consideration of the preceding cases, that the frequency or regularity of the pulse depended solely on the individual predispositions, since in cases in other respect identical it was sometimes frequent and occasionally regular. M. Rostan attaches considerable value to the state of the pulse for the purpose of establishing a diagnosis; it may, single and alone, he adds, guide us in the employment of therapeutic means, and in this view we entirely coincide.

MM. Lallemand and Bouillaud have laid it down, on the contrary, as a principle, that inflammation of the brain, supposing it exempt from all complication, exercises no influence on the circulation.

Out of 227 cases of softening of the cerebral hemispheres, either simple, or with hyperemia, or with the commencement of sanguineous effusion, or, in fine, with purulent secretion, the pulse, with

respect to the number of its beats, presented the varieties indicated in the following table: —

	TIMES.
Pulse in the normal state	26
Pulse retarded	15
Pulse accelerated	72
Pulse, first normal, then frequent	10
Pulse frequent, then retarded	2
Pulse not noticed with respect to its frequency	97

With respect to the strength of the pulse, it appeared very variable both in those which came under our own care, and in those published by others. The same may be said of its rhythm, which we found but very seldom modified. In the cases, however, noted by MM. Lallemand and Rostan, the pulse is set down as being frequently irregular or intermittent. We are inclined to suspect that in many of these cases there existed an affection of the heart.

The respiration is often influenced by softening of the cerebral hemispheres. Some patients who labour under this disease die from disordered respiration. This function may be disturbed in one or other of the three following ways: —

When the progress of the softening is very acute, when it is accompanied with symptoms called apoplectic, the respiration is modified from the commencement. It is at once accelerated, and becomes stertorous, as in cases of cerebral hemorrhage.

When the softening, on the contrary, makes slow progress, the respiration at first is not disturbed, but it gradually becomes difficult and irregular. It is evident from observing the way in which the movements of inspiration and expiration are performed, that the function of the lungs no longer go on as in the normal state; and we perceive a sort of slow asphyxia gradually take place, in which the patient dies.

Finally, there are several intermediate cases in which the softening is neither so rapid nor so slow as in the two preceding series, and where the respiration may still present remarkable modifications. We have seen some individuals in whom the respiration at first was not at all disturbed; then suddenly, without any known cause, it became accelerated and difficult; a rattle was heard all over the chest, and the patient died rapidly in a state of asphyxia. In such cases the lesion of the nervous system suddenly exercises on the respiratory apparatus an influence which was not felt at the commencement; and it is by disturbing the respiration that the affection of the brain produced death.

With respect to the duration of this disease, the inference which we are warranted in deducing, from the results of 105 cases, is, that softening of the brain is much more frequently an acute disease than a chronic one. We see that very few individuals die before the second day; the greatest number die, on the contrary, between the second and twelfth day. At the end of the first month, out of 105 subjects affected with softening, there remained more than six-

teen who survived it; after the second month, there remained more than ten; after the third month only seven individuals survived, and among these there were two who for three years resisted this cerebral lesion.

Hitherto we have always supposed that softening of the cerebral hemispheres terminated fatally. May it, however, terminate favourably? In order to be able to answer in the affirmative, it would be necessary that the symptoms to which it gives rise should be so characteristic, that the mere fact of their appearance would no more allow us to doubt of the existence of cerebral softening than the reddened sputa and bronchial respiration allow us to doubt of the existence of pneumonia. The difficulties in ascertaining with certainty the real existence of cerebral softening have obliged M. Rostan to withold any positive decision on the question as to whether the brain, once deprived of its normal consistence may afterwards recover it. This reserve of M. Rostan's we think absolutely required by the present state of science; and we do not think that M. Lallemand has satisfactorily proved, by the cases he has cited, that the circumscribed induration of one of the hemispheres is sometimes the mark of a softening which has been cured.

Death, which is the termination, at least very frequently, of this affection, may result from the mere disturbance which the softening of a part of the brain produces in the functions of this organ; and we have seen that a softening of very limited extent was often sufficient to throw those functions into the greatest disturbance. The softening may continue for a very long time without any other lesion complicating it; but, at other times, death is produced, or hastened, by one of these complications. We have already specified them. M. Lallemand's cases have proved that a great number of softenings might terminate, either by sanguineous effusions within the softened part, or by a secretion of pus which remains in a state of infiltration, or which collects into an abscess. Sometimes a hemorrhage takes place in a different part of the brain from that which is softened; and it is of the former that the patient dies. In other cases, an intervening affection of the meninges hastens death. Again, in cases where the softening follows a chronic course, inflammations of different organs, and particularly of the lungs and digestive tube, are added to the cerebral disease, and are the cause of death.

If it were satisfactorily proved that softening of the brain is but one of the forms or degrees of inflammation of this organ, the therapeutic indications would be always easily established; as then the antiphlogistic treatment should in all cases be adopted, only care being taken to proportion its energy to the strength of the patient, to his constitution, to the nature of the symptoms, &c. In the present state of our knowledge of the nature of this disease, we think that here, as in several other circumstances, the indications are furnished us less by the nature of the affection than by the symptoms which accompany it, and the general state of the economy. Suppose,

as often occurs, that softening of the brain is accompanied with all the signs of an active hyperemia, pulse strong and full, intense delirium, agitation, convulsive movements, rigidity, or contraction of the limbs: in such cases bloodletting is indicated. Caution, however, must be observed, as we have known more than one case wherein repeated and large bleedings were followed by an exasperation of all the symptoms. Nor are we satisfied that bloodletting can have any influence, except a bad one, on that species of mental depression which is presented in several individuals affected with softening of the hemispheres. In these latter cases, leeches applied from time to time to the anus seemed to us preferable to opening a vein: they may be applied also to the mastoid processes. Dry cupping towards the base of the cranium, a seton to the nape of the neck, revulsives on the lower extremities, seem to us the means particularly indicated. Internally, mild tonics may be serviceable; and in the last kind of case we supposed, we would recommend the daily administration of the different preparations of iron or quinine. Even admitting that every cerebral softening is an encephalitis, either acute or chronic, we would not shrink from the line of treatment we have now laid down; for in order to remove an inflammation in certain cases, and to arrest its progress in other cases, it certainly is not sufficient to attack it either by bloodletting or by revulsives. It is very often necessary to support the vital forces to a certain standard, below which inflammation cannot be resolved. Much has been said, in latter times, of the tendency which many inflammations have to pass to the chronic state, or to disorganization of the tissues, when they are not met at once by sufficient bloodletting; but, on the other hand, it must not be forgotten that excessive losses of blood may have precisely the same effect as insufficient losses. Great stress, also, has been laid, and with good reason, on that false state of adynamia which several inflammations bring after them by the mere fact of their intensity. We entirely agree in this mode of considering the subject, so admirably developed by M. Broussais; but we also admit another adynamia, which is no longer simulated, of which the symptoms really express the failing of the strength of the system, and which no longer depends on the intensity of the inflammation, but rather on the conditions of innervation and hematosis, when this inflammation supervened.

FOURTH ORDER.

OBSERVATIONS ON HYPERTROPHY OF THE CEREBRAL HEMISPHERES.

This morbid change, which is somewhat rare, has hitherto but little engaged attention. M. Bouillaud, in his *Treatise on Encephalitis*, and Dance, in a paper, published on the subject,* are the

* Repertoire d'Anatomie Pathologique, publié par Breschet, 1828.

only authors, to our knowledge, who have written any thing on it; we may add to these names that of Dr. Scoutetten, to whom we are indebted for a knowledge of a very remarkable case of this kind.*

Hypertrophy of the cerebral hemispheres should be distinguished from another affection, in which also these parts are increased in size, but this is by mere hyperemia; inconsiderable though it may be, this hyperemia produces in the brain, as elsewhere, a tumefaction of the parts where it exists. We have given some examples of this when treating of cerebral congestions; but that is not the character of true hypertrophy.

Hypertrophy of the brain should be not only distinguished from simple hyperemia; but again it should be known, that the first does not necessarily include the existence of the second, and that the contrary even most frequently occurs. Every time that we have found in the dead body a brain really hypertrophied, and not merely increased in volume by hyperemia, there was at the same time remarkable paleness. The cases of Dance give the same result.

It may be admitted in theory, that one of the consequences of frequent repetition of cerebral hyperemia, may be the production of hypertrophy: let us remark, however, that we have not the latter lesion in a certain number of individuals, whose bodies we examined, and who were for a long time subject to cerebral congestions.

It may also be supposed, that great activity in the exercise of the cerebral functions may equally produce, after a time, an excess of development in the organ which performs these functions. Are we, also, to presume that the hypertrophy found as the sole lesion in a certain number of epileptic subjects, did not exist at the commencement of the disease, and was itself but the effect of the violent perturbation which the brain underwent on the return of each epileptic attack?

At the same time that the brain, in becoming hypertrophied, tends to occupy a greater space, the bony case which incloses it sometimes does not increase in size, or it may become enlarged according if the brain itself become much developed. In the cases known to the present time, the former occurrence is more frequently met than the latter. It follows, that in most of the cases of hypertrophy of the brain the latter must be subjected to an habitual compression, more or less considerable. We may conceive how, under such circumstances, the occurrence of a slight hyperemia must be more serious. Instead of producing pain of the head or dizziness, it may give rise to the most alarming consequences; may bring on, for example, an attack of epilepsy; in some instances may occasion death. This will be readily conceived, if the anatomical characters of hypertrophy of the brain be considered, such as we have described them in our work on Pathological Anatomy, and such as they will be found in the cases to be cited hereafter.

We have not, up to the present time, seen hypertrophy of the

* Archives Générales de Médecine, tome viii. p. 31.

brain affect subjects more than thirty-five years old. The cases which we shall cite, and those published by others, relate to individuals aged from twenty to thirty years. But still it has been observed in infancy.

Hypertrophy of the cerebral hemispheres has been sometimes unaccompanied by any symptom; that is, when the parietes of the cranium are developed in the same ratio as the brain. Such was the case of the child detailed by M. Scoutetten. This individual, about five and a half years of age, had a head the size of which equalled that of an adult; it was by degrees that it increased thus. The development of the cranium was much more marked behind than before; the forehead was elevated, but not projecting; all the cerebral functions were duly performed; the intellect was suitable to the age of the subject. It was seen to sleep tranquilly and profoundly. The only phenomenon presented by this child was the frequent falls caused by the weight of the head, which was suddenly carried forward when it wished to run, and thus caused it to fall. It died of acute enteritis, towards the close of which the intellectual functions were completely abolished.

On opening the body, it was ascertained that the parietes of the cranium were thicker than usual. The brain itself presented nothing more than a great development of all its parts, particularly of the nervous mass situated above the ventricles. The latter contained but a very small quantity of the reddish serum. The pia mater was very much injected, and of an opaque white in some points. The dura mater adhered firmly to the bones of the cranium.

This is the only case we know of in which the hypertrophy of the brain was not accompanied by any symptom; but the simultaneous development of the encephalic mass, and of the parietes of the cranium sufficiently accounts for it.

The symptoms which, up to the present time, have accompanied hypertrophy of the brain, relate to certain disturbances of the intellect, sensation, and motion.

Several patients were in a real state of idiotism; in others we only remarked a dull state of the intellect, which increased and diminished alternately; then acute delirium was seen suddenly to supervene, or profound coma, and these two phenomena were soon followed by death. On one occasion we observed signs of mania.

In certain cases, a headache of long standing, which, at intervals become worse, and which was reproduced under the form of violent crises, was the prevailing symptom. Several patients complain of vertigo, or dizziness, as if they had simple cerebral congestion. In others, the sensibility becomes suddenly more obtuse; or else a period arrives, when, after having remained a long time sound, it is suddenly abolished.

The disturbances observed, with respect to motion, are of several kinds. Sometimes it is mere debility of the limbs, which goes on increasing, and terminates in general paralysis; sometimes there are convulsive movements, at first infrequent, and not intense; then

more frequent and more severe: the patient may die in these convulsions, or in the coma which succeeds them. At other times, hypertrophy of the brain betrays its existence principally by a group of symptoms which characterise epilepsy, the attacks become more frequent, and death supervenes in one of them.

The functions of organic life are not in general disturbed by hypertrophy of the brain. The pulse has usually its accustomed frequency; sometimes, however, it becomes slow. We have seen one case where it was only forty-five.

The symptoms connected with hypertrophy of the brain are so arranged, that two periods may be reckoned from them: one, in which it presents all the characters of a chronic affection; and the other, in which it suddenly assumes the appearance of an acute affection. It is in the second period that the patients die.

During the first period, the symptoms remarked are especially different disturbances of the intellect, a slight or intense headache, which is permanent or transient; convulsions at intervals; and, finally, true epileptic attacks, more or less repeated. These different symptoms may all exist in one and the same subject, or develop themselves separately.

After this period has lasted a longer or shorter time, the second comes, unless the patient be previously carried off by the intervention of some other affection. Then different symptoms and different forms of diseases appear: thus, some individuals are seized suddenly with very violent convulsions, in the midst of which they die; others present the signs indicative of compression of the brain, or else those characterising acute hydrocephalus. Some die almost suddenly. The following cases which we have collected, will serve to confirm and develop the general propositions which have been now laid down:

Case 1.—Megrim (sick-headache) of long standing, which was succeeded by constant pain of head—At a latter period, convulsive movements, whose severity, constantly increasing, brought on death.

A man, twenty-nine years of age, of strong constitution, gave us the following history of himself, on entering the *Maison de Santé*, in Sept. 1830. At the age of seventeen, he began to feel a violent headache, accompanied with vomiting. This went off after twenty-four hours. From the age of seventeen years till he was twenty-eight, two months scarcely passed without his experiencing the same symptoms, which were considered by him and by those who saw him, as attributable to megrim. When he had it not, he enjoyed very good health. It was only about a year previous to his being submitted to our care that these symptoms, which had not appeared up to that period of any importance, assumed a more serious character. He then began to feel constantly a pain, which occupied the entire head, but more particularly the frontal region and the two temples. This pain, usually dull, became, from time to time, very intense; then the patient shunned the light, pressed his head with

his hand in order to relieve himself, and remained very quiet. Six months after this headache commenced, he was seized one day, in the two arms, with involuntary movements, and convulsive twitches, which he could not resist, and which were accompanied with an acute pain in the convulsed limbs. This new series of phenomena lasted for some hours. When the convulsions ceased, the patient remained very much fatigued; and dating from this time he was weak and languid, he always felt as if exhausted by running a very long race. He was averse to moving, and every morning on awaking he felt himself quite languid. Pain of the head continued, and became more intense. During the six months preceding his admission to the *Maison de Santé*, he felt five or six times, in the two upper extremities, the same convulsive movements. In fine, these became all at once much more intense, and at the same time much more frequent. During the eight days preceding his admission, they were nearly constant, and began to attack also the lower extremities, and more particularly the left.

When the patient was first examined by us, he looked like a man worn down with fatigue; he was able, however, to state, with ease and precision, all the details we have now given. He had not at that time any convulsions, and could not speak of their return without a degree of terror. The headache was now moderate, on the preceding day it had been most violent. The senses presented no alteration. Pulse natural; appetite considerably diminished for some time back.

We were very much puzzled to form a diagnosis of such an affection; it had in its symptoms something unusual, which did not appear to be connected with any of the known cerebral lesions. What in particular was the cause of those intermitting convulsions, in the intervals of which motion remained perfectly free, and which, for a long time confined to the upper extremities, have more recently become general, and extend to the lower limbs? If the patient had not felt that headache, so remarkable for its long standing, its continuance, and its periodical exacerbations, we should have thought that the spinal marrow was the source whence all these symptoms derived their origin; but unable to pronounce an opinion on the nature of this lesion, it seemed to us that the different symptoms we observed might depend on the existence, within the two hemispheres, of accidental products slowly developed. Were they tubercles? We hesitated to admit it, recollecting the law laid down by M. Louis, and the truth of which we have so often proved, according to which tubercles are rarely found in other organs, except when they have been in the lungs. Now in this person the respiratory apparatus appeared perfectly sound.

Such were our reflections on the case of this patient, and the hypothesis we assumed regarding the nature of his complaint was far, as we shall see, from representing the truth.

On the following days the patient was in a deplorable state. The pain of the head became more intense than ever; it was so

violent that the patient made the ward resound with his groans and cries. This attack lasted during two or three hours; then the pain diminished, without ever entirely disappearing, and at this time the patient, as if worn out by his sufferings, remained immoveable, without however being able to get any sleep. Once or twice a day he felt, both in the upper and lower extremities of the right and left side, twitches which were painful, but of short duration; occasionally also the muscles of the face were affected by some convulsive movements. In the midst of all these disturbances the intellect remained sound, and the pulse was fifty-five.

Nine or ten days passed on in this way, at the end of which time the convulsive movements became suddenly much more violent; the face and four extremities being simultaneously their seat. After having lasted almost without interruption for thirteen hours, they ceased suddenly; but nearly at the same time the respiration became embarrassed, then stertorous, as in apoplectic patients, and the patient died speedily.

Post-mortem. — The meninges presented nothing extraordinary. The external surface of the brain struck us by its very singular appearance: the spaces separating the convolutions had disappeared; the latter were compressed, and as it were squeezed together; they evidently acquired a greater development at the expense of the anfractuosities. Not a drop of serum in the arachnoid or pia mater, nor in the lateral ventricles, the parietes of which touched and pressed each other much more than natural. The nervous substance itself presented two remarkable changes with respect to its colour and its density; its colour was so changed that at its circumference the grey layer of the circumvolutions was scarcely any longer distinguishable from the subjacent white substance. The latter itself is every where bloodless; on cutting it we do not perceive the orifice of any vessel, nor can we distinguish the least drop of blood in the slices that are taken from it. The grey substance scattered on the interior of the hemispheres, more particularly that entering into the composition of the optic *thalami* and *corpora striata*, was colourless as the grey substance of the convolutions. Through the entire extent of these hemispheres, the substance constituting them attained extraordinary density; it resembled the white of an egg hardened by boiling; it has the same consistence and the same elasticity also.

Remarks. — The anatomical characters of hypertrophy of the brain are very well marked in this case. The increase of density here coincided with the increase of volume, as was satisfactorily proved by the total effacement of the anfractuosities; the blood also had really fled from the cerebral substance, so that there was here a coincidence of hypertrophy and anemia.

Is the headache, in such a case as this, the result of the compression to which the nervous substance was subjected? It was for a long time the only symptom. At the time it was considered as a simple megrim. Did it already announce the commencement of

the cerebral lesion? If so, the latter was formed very slowly, and a long time elapsed before it produced serious symptoms and endangered life. These symptoms principally affected motion and respiration. The intellect continued constantly sound, whilst, on the contrary, it was disturbed in the following case.

CASE 2.—Gradual weakening of the intellect—Epilepsy—Pain of the head of long standing—Death in the midst of an attack.

A female, twenty-seven years of age, was epileptic from the twelfth year of her age, when she entered the hospital *Cochin*. From the age of twelve up to nineteen, the period at which she menstruated for the first time, she had an attack of epilepsy nearly every three or four months. The appearance of the menses did not cure her; on the contrary, from this period the attacks became more frequent; three weeks did not pass without the occurrence of one. Towards the age of twenty-one, she began to feel at intervals a violent pain of the head, which she called megrim; it returned about every six weeks or every two months, and was neither preceded nor followed by the epileptic attack with which it really did not seem to have any connexion. Up to the age of twenty-four, this woman thus continued subject to the two affections which we have just mentioned. In the intervals between her paroxysms of headache, and of epilepsy, she presented no disturbance of intellect, sensation, or motion. The menses came regularly every month; but between her twenty-fourth and twenty-fifth year, the disease changed its aspect; the headaches were no longer so violent; they no longer returned under the form of paroxysms; but the patient began to feel habitually a dull sort of pain of the head, principally seated toward the forehead, and which consisted in a feeling of weight; the attacks of epilepsy became more and more frequent, and at the same time the intellect, till then entire, began to be altered. This woman's temper became very strange; there was observed something singular in her conduct and manner, which caused those who usually saw her to say that she was becoming insane. This modification of the intellect was not of long duration, and soon, instead of being perverted, it was only weak. Insensibly this woman fell into a state resembling imbecility at the very highest stage, when she was admitted into our wards at the *Hôpital Cochin*. From thence she was removed to the *Salpêtrière*. We learned all the history of the case from her relatives. They further told us, that for the last year she had not passed three days without having an attack of epilepsy, and that often she had several of them in one day. The menses had ceased to appear for the last six months only. On our examining her, we could only discover weakness of intellect; the power of motion was free; sensibility not affected. The functions of the life of nutrition did not seem to have undergone any perceptible change.

During the five following days the patient had almost every day an attack of epilepsy, which we did not witness. On the sixth day,

dating from her admission, we found her dead in her bed. According to the account of the attendants, she had been attacked during the night very violently, which was followed by a profound stupor, in which she died. We satisfied ourselves, however, that the attacks were epileptic.

Post-mortem. — We had scarcely raised the arch of the cranium, when we were struck with the singular tension presented by the dura mater. It was very much pressed from within outwards by the substance of the brain. When we cut into it, we discovered the two other meninges, of which the one, namely, the arachnoid, was, at its free surface, remarkably dry, and of which the other, the pia mater, entirely deprived of serum, was traversed by some veins containing a very little blood. These two membranes were torn with very great facility. Beneath them the external surface of the brain had a singular appearance. No anfractuosities were any longer distinguishable there, so much were all the convolutions pressed one against the other. The nervous substance, through the entire extent of the hemispheres, was remarkably pale; scarcely could the grey substance be distinguished from the white by the colour. This substance had also attained throughout great density; in most of the parts, where it was examined, it was found similar, as in the preceding case, to white of egg hardened by boiling; in some this pulp had really the consistence of a cartilage. The ventricles were quite empty of serum. The *corpus callosum*, *fornix* and *septum*, were also increased in density; on the contrary, the *pons Varolii*, *cerebellum*, and the spinal marrow had their natural consistence.

Remarks. — This case, compared to the preceding one, resembles it very much with respect to the anatomical lesions; and yet, in certain respects, the symptoms are not the same. The two individuals were equally subject to an intense headache; in the first, it was, for a long time, the only phenomenon: in the second, it alternates with epileptic attacks. Epilepsy replaces the simple convulsive movements in the subject of the second case; in her, the disturbance of intellect was very marked, whilst in the other the intellectual faculties preserved all their clearness.

Case 3.—Gradual feebleness of mind, motion, and sensation—Convulsions at intervals with loss of consciousness—Death in an adynamic state.

A countryman, thirty-nine years of age, at the time of his entering the hospital *La Pitié*, began to feel, for about ten years before, pains of the head, which returned at intervals, some of them being accompanied with confusion in his ideas. One day, the pain of head returned with more violence than ever, and, after having been tormented for three or four hours, he was seized with strong convulsions, and he soon fell, deprived of consciousness. At the end of a little time he came to himself; but, dating from this moment, he no longer recovered his usual intellect; he had less memory, he was no longer capable of any employment, and he was obliged to give up his situation. During the following years, his mind became

weaker and weaker, and, at the same time, the muscular strength gradually diminished, as also the sensibility. At intervals, this man suddenly lost consciousness, and he was seized with convulsive movements in the four extremities.

After having been a long time in the hospital of the country where he lived, he was brought to me, and I received a written note, containing the preceding details; for he was himself incapable of giving any.

When I saw him, I could scarcely force from him the most vague answer; a continual air of abstraction was imprinted on his countenance; he was observed to laugh and cry without any motive; he scarcely knew whence he came or where he was. When asked whether he felt pain in any part, he pointed towards his forehead. Cutaneous sensibility very obtuse. It was with considerable difficulty he could sustain himself on his legs, nor then without staggering, and from time to time they entirely failed him: they seemed both equally weak. A constant trembling agitated the upper extremities; and the two hands could neither of them hold any thing; vision was sound, as well as the other senses; he did not however appear to perceive smells: pulse 56; digestion good; the respiration tranquil.

This patient was admitted into one of the wards of *La Pitié*.

During the three first weeks he was in the hospital his case presented nothing new; only at three different times he lost consciousness, and had convulsive movements; these circumstances were seen by the sister of the ward alone. This man, who was remarkably taciturn, remained immoveable in his bed, and they were obliged to watch him as a child. During the fourth week of his stay, a large eschar began to form on the sacrum; the tongue became dry; teeth black; fæces and urine passed involuntarily. Death five weeks after his admission.

Post-mortem. — The cerebral hemispheres presented in their circumference the same appearance as in the two preceding cases; there was here the same packing of the convolutions, the same effacement of the anfractuosities, the same hardening and paleness of the nervous substance; in fine, the same dryness of the enveloping membranes. As in other cases, the *cerebellum*, *pons*, and spinal marrow were not affected.

Remarks. — Here again we find symptoms very much resembling those presented by the two preceding cases, but they are combined and connected differently. The first phenomenon which appeared was a headache, which returned occasionally, and which was not connected with any other serious symptom; then suddenly there came on other phenomena, which have at least some resemblance to those characterising epilepsy; and dating from this period, the intellect, hitherto sound, became disturbed, and gradually weaker. Anatomy really shows us but the last term of the disease, and does not reveal to us all the shades or all the degrees through which the morbid alteration must pass, from the moment when it evinced its

existence only by a transient pain of head when serious disturbances were announced by an attack simultaneously of the intellect, motion, and sensation. What, for example, was the change, which came on suddenly in the brain, the day when, with equal suddenness, the patient was seized for the first time with an epileptiform attack? Did hypertrophy of the brain already exist at this period? Was there as yet but mere cerebral congestion? Did congestion ever exist at any period of the disease? This congestion, which is so convenient to serve as a means of explaining a great number of cerebral disturbances, is it as common as we imagine? We would have good reason to doubt it, if we reflect that, in many of the cases, where the symptoms which we attribute to it had existed during life, anatomy shows us no sign of it. It is certainly from views altogether hypothetical, we constantly make it come in to explain, either most of the lesions of organisation, or many functional disturbances.

Here are three cases where the brain is the seat of a precisely similar alteration. Why was the intellect disturbed in the two latter cases? Why did it remain sound in the first?

FIFTH ORDER.

OBSERVATIONS ON ATROPHY OF THE CEREBRAL HEMISPHERES.

We have elsewhere pointed out all the degrees of this atrophy, from that wherein the hemispheres are completely wanting, to that wherein some convolutions are absent, or incompletely developed. We shall here direct our attention particularly to those cases of atrophy, which are compatible with the possibility of a more or less prolonged extra-uterine life.

These are the cases wherein there is atrophy or want of development, either total or partial, only in the nervous mass situated above the ventricles.

We have not seen any case in which the complete absence of this nervous mass of the two sides coincided with the duration of life, beyond a few months after gestation; but authors have cited examples of it, and in these cases it was merely vegetative life.

When atrophy exists only in one side, life may continue for a very long time. We have seen cases of this kind in which, above the lateral ventricle of one side, there was no longer found any nervous substance; the arachnoid, usually covering the convexity of the hemispheres, was found in apposition to that which should line the parietes of the ventricles; these two folds of one and the same membrane were separated from each other by a cellular tissue provided with a great many vessels. Sometimes in such cases the cranium preserves its natural form and dimensions; in which case

a great quantity of serum raises the arachnoid, and also fills the vacuum, which would exist without it, between the cranium and remaining parts of the hemispheres. Sometimes the form of the cranium is changed; its parietes are, as it were, sunk in the points which correspond to atrophy of the brain; and during life we find on one of the sides of the cranium, a greater or less depression, which may assist in the diagnosis. Here is a remarkable example of the first of these two cases.

Case I.—Absence of the entire nervous mass above the right lateral ventricle, with the exception of the part anterior to the corpus striatum—Normal conformation of the cranium—Lesion of motion in the left extremities—Mind sound—Pulmonary tubercles.

A man, twenty-eight years of age, fell, when three years old, from the first story into the street, on his head. After this fall he remained paralysed on the left side. By degrees an habitual extension of the left foot on the leg was established, so that on this side he walked only on the point of the foot. The left upper extremity was completely deprived of motion; no trace of contraction any where observed. This person had some education, and has profited by it; he had a good memory; speech perfectly free; and his intellect such as is ordinarily met with in the generality of persons. Having entered the infirmary of *Bicêtre*, where he lived, for a chronic affection of the chest, he was there seized with symptoms of acute peritonitis, of which he died.

Post-mortem. — The vault of the cranium having been removed, the meninges of the right side were found transparent, and fluctuating through almost their entire extent. They were cut into, and a clear limpid serum, like spring water, gushed forth. Between these meninges and the ventricles there existed not the slightest trace of nervous substance. These membranes constituted the upper wall of an immense cavity, the lower side of which was formed by the optic *thalamus*, the *corpus striatum*, and all the other parts situate on the level of these two bodies. Of the nervous mass above the ventricles there remained only that which, being anterior to the *corpus striatum*, forms its anterior wall. Numerous tubercles were in the two lungs, and several ulcerations appeared on the surface of the small intestine. There was a perforation in the ileum, whence the peritonitis which terminated the life of the patient.

Remarks. — The lesion, discovered in this case, began from external violence, twenty-five years before the period when it came under our inspection. The atrophy of the brain was not probably here the primitive alteration: it succeeded to other changes of an inflammatory nature which supervened immediately after the fall.

The perfect preservation of the intellect up to the last moment is certainly a remarkable circumstance in a case where so great a portion of the brain had for a long time been moved.

In a similar case, quoted by M. Breschet, of a child four years old, the mind was, on the contrary, very much altered; the child was

completely idiotic; it was dumb, though not deaf; and could not sustain itself on its feet.

It more frequently happens that we find atrophy of only a smaller portion of the nervous mass above the ventricles. In this case it is most commonly in one of the anterior lobes that the defect of development exists. Separate atrophy of this lobe has been seen at all ages, from commencing infancy to advanced old age. The following is an example of it, observed by us on an individual seventy-one years old: —

Case 2.—Hemiplegia of a long standing—Obtuse state of the intellect, great difficulty in speaking—Atrophy of the anterior lobe of the left hemisphere.

A man, seventy-one years of age, entered *La Pitié* in a complete state of childishness. We could obtain no information regarding his previous history. We ascertained in him the existence of a complete paralysis both of motion and sensation of the right side of the body; he stammered out some unintelligible words. This man gradually became weak, and died about a month after his admission. During the last eight days of his life we observed that he coughed, that his respiration was embarrassed, and his tongue had become dry.

Post-mortem. — The left hemisphere in its anterior fourth was replaced by a cyst with transparent parietes, filled with limpid serum; one very thin layer of nervous substance separates it from the *corpus striatum;* thus it does not immediately form the wall of the ventricle. The left lung was in the state of red hepatisation throughout its entire extent.

Remarks. — There was hemiplegia in this case, though the lesion had attacked only the anterior part of hemisphere, and the intellect was disturbed, though the atrophy was much less considerable than in the subject of the first case, where it remained sound.

M. Breschet has published the remarkable case of a girl, fifteen years of age, in whom the two anterior lobes were wanting. At the bottom of, and behind, the membranous pouch which replaced them, the two *corpus striata* were seen exposed. The head was very well formed.

This girl was plunged into a complete state of idiocy; it was necessary to dress her and feed her; she was averse to walk, though she had the power of moving all her limbs with ease, and with equal facility; she was usually sitting, and remained so for entire days, alternately inclining the head from one shoulder to the other; vision was entire; the most perfect indifference existed for the quality of odours.

Here was a case where atrophy of the two anterior lobes did not bring on paralysis, properly speaking. Neither did this paralysis exist in two other subjects, who were still younger, for a knowledge of which we are also indebted to M. Breschet.

In one of these cases the individual, nineteen months old, was able to move his limbs with ease, only there was observed in him

an almost continual flexion of the trunk backward. This child was deprived of sight: after having remained for about four months in this state of opisthotonos, he was seized with convulsions, of which he died.

All the mass of the hemispheres situated above the ventricles was less developed than usual; anteriorly it was completely wanting on both sides, and in its place all that was found were the meninges raised by a great quantity of serum. The head was in every other respect well formed, only it was somewhat large.

In the other case the child, twenty-two months old, also had the cranium well formed; he was affected with strabismus; motion and sensation were complete. This child died of a gastro-enteritis. The same alteration of the brain was found in him as in the preceding.

Besides these cases, in which the nervous substance was replaced by serum in greater or less abundance, other cases may be cited in which this serum no longer existed, and where all that were observed was a greater smallness in the different parts of one of the hemispheres, and particularly of the convolutions. This species of atrophy seemed to us sometimes primitive and congenital, sometimes consecutive to, and developed after a number of diseases. There are some cases of this kind published by M. Casauvieilh, in his interesting paper on cerebral agency.*

The persons whose cases he cites, aged from twenty-seven to sixty-eight years, were all affected for a great number of years back with lesions of motion on one side of the body (hemiplegia, simple or with contraction), and their intellect was more or less obtuse. The extremities opposite to the atrophied hemisphere had in their different dimensions less development than the others.

Instead of atrophy affecting but one of its hemispheres, the brain may present, in both sides at one and the same time, in several of its parts, a deficient development considerable enough seriously to interfere with its functions. This general atrophy of the brain existed in a remarkable manner in an epileptic patient, whose case is recorded by M. Calmeil.†

In the cases recorded by M. Casauvieilh, the lesion of motion was more ardent than that of intellect. The same also occurred in the following case, seen by us some years since at *La Charité*.

Case 3.—Forty-seven years of age—Hemiplegia of long standing—Mind a little weakened—Atrophy of one hemisphere, with hardening of its substance—Death by pneumonia.

A man, forty-seven years of age, was paralysed in the entire left side of the body, when he was admitted into *La Charité* under the care of M. Lerminier. This paralysis had existed all his life: he had not, at least, any recollection of when it commenced; all he said was, that in his childhood he could not use his extremities of the

* Archives Générales de Médécine.
† Journal Hebdomadaire de Médécine, tom. i. p. 225.

left side. There was no trace of contraction; the limbs deprived of motion were manifestly thinner, but shorter than those of the opposite side; the skin covering them had preserved all its sensibility. The intellect appeared to be a little weakened; he possessed, however, his reason, and could join in a connected conversation; the functions of the life of nutrition were duly performed. This man was seized suddenly with symptoms of acute pneumonia, of which he died.

Post-mortem. — The cranium was considerably depressed over all the right side. We had not observed this depression during life. On the right, also, it has less extent in its different diameters, and its walls are manifestly thicker than on the left. The meninges present nothing remarkable; the two hemispheres are different in size, the right evidently smaller than the left. This greater smallness evidently depends on the shrivelling which the middle lobe had undergone, the tissue of which was, at the same time, remarkably dense. The optic *thalamus* and *corpus striatum* of the right side are much smaller than the same parts on the opposite side. The right lateral ventricle contains more serum than the other, and is also larger. The left lung is in a state of red hepatisation, in the two-thirds, at least, of its extent.

Remarks. — Was the change, of which the right hemisphere was the seat, in this subject, congenital; it may be supposed so. It had left mind and sensation almost entire; motion alone was seriously compromised, and, in the paralysed limbs nutrition was less active, as was proved by the commencement of atrophy of these limbs. What was the cause of this atrophy? Was it merely the want of exercise on the part of the muscles? Was it a less action of the brain on the nutrition of the parts, and if this fact may serve to prove the influence exercised on nutrition by the nervous system? In fine, the same cause which in the fœtus had produced in one of the sides of the brain a suspension of growth, had it interfered, at the same time, with the evolution of the limbs opposite to the atrophied hemisphere?

There was here but simple paralysis; in other cases, where the lesion was precisely similar, the limbs deprived of voluntary motion were, at the same time, contracted. The same phenomena were presented by some of the cases of M. Casauvieilh. We saw this exist, also, in the patient of *Bicêtre* whose case has been already detailed. This may also be seen in the following case recorded by M. Boulanger.

A child, two years old, experienced a constantly increasing difficulty in moving the extremities of the right side; there supervened a state of permanent contraction of these limbs, and particularly of the upper extremity of the right side. The right forearm very much contracted on the arm, and it cannot be extended without causing pain. He complains of a fixed pain in the left parietal region; *the intellectual faculties are sound;* he speaks very well, likes to play and converse. He arrived at the age of four years, and then died of pneumonia.

On opening the body, the anterior lobe of the left hemisphere was found as it were depressed by *a furrow which was filled by a serous infiltration of the pia mater* (these are the author's own words). The convolutions were pressed inwards, changed to a black and yellowish colour; *the septum lucidum did not exist.*

It is to be remarked here, that the alteration of the right hemisphere did not consist in mere atrophy of its substance; the latter in those parts where it had less volume, presented at the same time a remarkable change of consistence. Was there then a compression and accumulation of the molecules of the nervous tissue, rather than a real lessening of their number; and was the atrophy but apparent? The third case of M. Casauvieilh presents, in this respect, a similar phenomenon, that is, coincidence of smaller volume and greater density; but in several other cases of his, we see these two lesions no longer go together; the consistence is normal, and yet the nervous substance does not occupy the space it should ordinarily fill.

When the atrophy is still more inconsiderable or more general than in our case and in those of MM. Casauvieilh and Boulanger, the intellect becomes in its turn more seriously disturbed; it is usually abolished, and the individuals are born idiots, or become so. The following case is in support of this opinion: —

Case 4.—Seven years—Idiocy—Epileptic convulsions—Pulmonary tubercles.

In the year 1821, there was in the *Hôpital des Enfans*, under the care of M. Jadelot, a little girl seven years old, who, from birth, had not given the least evidence of intellect. The two lower extremities were much more slender than might have been expected from her age; no voluntary motion could be imparted to them by the patient, who remained constantly lying down; the upper extremity of the right side was habitually the seat of strong contraction. This child did not speak, and it presented all the traits of complete idiocy; from time to time it was seized with convulsive movements, which bore considerable resemblance to the convulsions of epilepsy; she died of pulmonary phthisis.

Post-mortem. — The cranium had, more particularly anteriorly, much smaller dimensions than what is usually seen at the age of this individual.

A copious serous liquid infiltrated the pia mater over the entire convexity of the hemispheres; this liquid had put an interval of several lines between the arachnoid and brain.

The convolutions, on the right as well as on the left, but more anteriorly than posteriorly, were remarkable for their deficient development, and at the same time for their diminished number. They were shrivelled, and, as it were, decayed; the result of this was, that on the different points of their convexity, the cerebral hemispheres did not present a surface which had every where the same level; it was on the contrary singularly uneven: it presented a series of elevations, few in number, and of depressions much more numerous. In most of the depressions the nervous tissue was very dense; it

had even in some parts a cartilaginous consistence. The lateral ventricles were very large and filled with a great quantity of limpid serum. The optic *thalami* and *corpora striata* were very small; it was particularly on the left that this defect of development was remarkable; and on this side the optic *thalamus* was all unequal and wrinkled.

Remarks. — This case presents us, with respect to motion, the same disturbances as the preceding; to this is added a very serious deficiency of the intellect, which is amply accounted for by the greater degree of cerebral atrophy, and its existence in both hemispheres. The contraction of the right upper extremity corresponds with the greater atrophy of the optic *thalamus* and *corpora striatum* on the left than on the right. In these cases of atrophy, as well as in the cases of hypertrophy previously quoted, the cerebellum does not follow the condition of the brain. No matter how perceptible the modifications in the size of the latter; the other is not influenced by it, at least in the generality of cases; for among those of M. Casauvieilh, there is one where we see the hemisphere of the cerebellum participate in the atrophy affecting the cerebral hemisphere of this side.

In the case now cited, the lateral ventricles were remarkable for their extreme size, which contrasts with their diminution or obliteration, so perceptible in the cases of hypertrophy above detailed.

SIXTH ORDER.

OBSERVATIONS ON CANCER OF THE BRAIN.

This affection, characterised by the existence, within the nervous substance, of new products known by the name of scirrhus and encephaloid matter, is rather rare. The remarks which we shall present on it are founded on the analysis of forty-three cases, some of which occurred in our practice, whilst the others are scattered through different medical works.

In these forty-three cases, the cancer had not always for its seat the cerebral hemispheres themselves; thirty-one times it affected these hemispheres; three times the pituitary gland; five times the cerebellum, once the *pons varolii;* and three times the spinal marrow.

The size of the cancerous masses developed in the nervous centres is far from being always the same; there are some cases where one entire hemisphere was transformed into a cancer; there are others where the accidental product scarcely equals the size of a nut.

This number is equally variable; sometimes there is but one; sometimes several are found, which occupy different points of the encephalon.

Around these cancerous masses the nervous substance is far from presenting an always identical appearance. There are some cases where it exhibits all the conditions of its normal state; there are others where it is altered; either simply injected in different degrees, or hardened and more frequently softened.

When the cancer affects the periphery of the brain, it may attack the meninges and destroy them; it may again extend its ravages to the bony structure itself. Cases have been seen where it completely destroyed the temporal and frontal bones; others have been seen, where, after having perforated the cribriform plate of the ethmoid bone, it penetrated into the nasal fossæ, and filled the different sinuses which communicate with these cavities. In one case the cancer, developed on the side of the lower surface of the brain, escaped from the cranium, sending ramifications through the foramina of its base.

When the cancer is situated so as to touch the nerves, it seldom leaves them entire; sometimes they also undergo the cancerous degeneration; sometimes they are compressed or destroyed by the tumour which surrounds them.

Among the forty-three cases included in our analysis, there were ten in which the cancer, of which the nervous centres were the seat, had also attacked other organs. In none of these ten cases does the brain appear to have been the primary seat of the disease, and different parts must already have been attacked by it, so that the nervous centres may be affected in their turn. Sometimes also the brain becomes cancerous, only after a cancer had been removed from some part. There was a remarkable case of this nature lately in the wards of *La Charité*, in the words of MM. Boyer and Roux:—A man received a blow on the testicle; this organ remained tumefied and painful, and rapidly underwent the cancerous degeneration; it was removed. Up to the moment of the operation all the other organs appeared sound. The diseased testicle had not been long removed, when, all at once, this man, who had hitherto enjoyed a tolerable good state of health, wasted away rapidly; he died, and on opening the body, enormous cancerous masses were found in all the lymphatic ganglia of the mesentery, in the liver, in the spleen, in the lungs, and finally in the brain.

Thus, in this case, external violence acts as a purely occasional cause to develope, in the part accidentally irritated, a lesion to which the economy was predisposed; without this predisposition it would not have produced it. Immediately cancers sprout up from all parts; there is no longer a necessity, in order to give rise to them, for an external irritation, similar to that which had acted on the testicle; but, what is remarkable, this diathesis does not appear, or at least the symptoms do not betray it to us, until the organ is removed, in which the cause of the cancer seemed to be enclosed.

The causes under the influence of which the cancer of the brain is developed are not better known than those which produce it in

the other parts of the body. Here, as elsewhere, a predisposition must be admitted, without which the occasional causes are inefficient. These latter themselves are not appreciable, except in a very small number of cases. Thus, out of forty-three cases there were but two in which the cancer of the brain succeeded to external violence, to which the cranium had been subjected. In none of these cases did it develop itself after an acute disease of the brain, or of its envelopes.

Cancer of the brain has been observed at the most different periods, from the age of two years up to that of seventy-seven. The following is what our forty-three cases present to us in this regard.

Before the age of twenty years, eight cases of cancer of the encephalon were observed, of which

2 cases were at - 2 years.	1 case was at - 11 years.
1 - - - - - - 3	1 - - - - - 14
1 - - - - - - 4	1 - - - - - 17
1 - - - - - - 7	

From twenty to thirty years of age we know of but two cases, one of which was of a subject aged twenty-one years of age, and the other an individual aged twenty-nine years.

From thirty to forty years of age we find eight cases distributed, as follows:

2 cases at - - - 33 years.	2 cases at - - 37 years.
1 - - - - - - 34	2 - - - - - 38
1 - - - - - - 36	

From forty to fifty years of age we find eleven cases distributed, as follows:

1 case at - - - 40 years.	3 cases at - - 47 years.
1 - - - - - - 41	2 - - - - - 48
3 - - - - - - 45	1 - - - - - 50

From fifty to sixty years of age we find nine cases distributed, as follows:

1 case at - - - 51 years.	1 case at - - 57 years.
3 - - - - - - 52	3 - - - - - 58
1 - - - - - - 55	

From sixty to eighty years of age we find five cases distributed, as follows:

1 case at - - - 62 years.	1 case at - - 71 years.
1 - - - - - - 64	1 - - - - - 77
1 - - - - - - 66	

In the same manner as with all the other accidental products developed in the brain, cancer does not reveal its presence by any characteristic symptoms. According to its situation, size, state of the nervous substance around it, and in a word, according to the manner (and that is altogether vital) in which the brain is affected by its presence, this morbid product is accompanied by different phenomena, and it is much less by their own nature than by their

mode of appearance and connexion, and by the whole of the circumstances of the disease, that we can establish a diagnosis.

These phenomena may regard the intellect, motion, sensation, and the different acts of organic life.

The mental disturbances are by no means constant; far from it, in the greater number of cases observed up to the present time, the intellect has remained totally entire. In others, it is disturbed only in the latter period of the disease. There are cases also where it is but at intervals more or less remote that the intellectual faculties become impaired; the individuals affected present from time to time either an obtuse state of the mind, or a greater or less loss of memory, or a true delirium. In fine, some of the individuals, in whose brain cancer has been discovered, have been affected with insanity.

Neither are the lesions of motion more constant than those of intellect; they have been found absent in more than one case. When they do exist, which is the most common event, they generally consist in a paralysis which comes on gradually. Sometimes this paralysis is partial, simple hemiplegia, or else paraplegia. This latter species of paralysis took place in a remarkable case cited by M. Esquirol, in which each anterior extremity of both hemispheres was occupied by a cancerous mass.

This paralysis may be simple, or complicated with contractions, either continually, or at intervals.

In several cases convulsive movements, sometimes partial, sometimes general, come on at intervals.

Finally, in more than one case the existence of attacks of epilepsy has coincided with the development of a cancer in different points of the encephalon. Thus the further we advance, the more we see epilepsy show itself in connexion with lesions of the most different kind.

The lesions of sensation are as variable as those of motion and intellect. Thus the pain of head, though frequent, is not observed in all cases; it presents the greatest differences with respect to its intensity, sometimes being very slight, and being mentioned by the patient only when he is questioned on the subject; sometimes so intense, that it constitutes the predominant symptom of the disease. Its nature varies as its intensity: it is far from always having that lancinating character which is laid down as connecting itself particularly with cancerous affections. This kind of pain has been rarely remarked in the different cases of cancer of the brain published up to this day.

If we consider this pain with respect to its seat, we shall find that in certain cases it is general, and by no means indicates the point of the brain which is the seat of the lesion; whilst in other cases it exists only on one side, and is then of more value as a diagnostic sign; but if in this case it is explicit regarding the seat of the affection, can it reveal its nature? Certainly not; for it may be produced by several other lesions, and, among them, by a softening, as we have

seen. Is it then by its particular character, or by its intensity, that we shall distinguish the pain of cerebral cancer from that which accompanies other affections of the encephalon? We never can attain more than mere probability on this subject.

The pain of cancer of the brain simulates in some cases a neuralgia by the manner in which it radiates, from always the same point, towards other parts of the cranium. As a neuralgia, it may develop itself under an intermittent form, without, however, there being any regularity in its returns. Like certain pains called nervous, we have seen it diminish by greater or less pressure made on the points which it occupies. Bleedings, which have no influence on the organic affection of which it is a symptom, may, however, diminish it, or even make it disappear for a time. Amongst the cases that have been published, there are some in which we see the pain return, or become exasperated at the return of each menstrual* period, and then cease or diminish when once the discharge is established. In all these cases, however, the organic lesion continues the same; but around it the state of the nervous substance is continually changing.

Pain more especially felt in the head in cancer of the brain may exist also in other parts. Thus, in certain cases, individuals labouring under this affection have experienced in the trunk and extremities pains more or less acute, which simulated very closely rheumatic or nervous pains. Others have presented an extraordinary exaltation of the cutaneous sensibility; the skin could not be touched without a most painful impression being felt, whilst at other times, on the contrary, the skin lost all sensibility. Sometimes, in fine, an insupportable itching tormented the patient. Thus from one and the same lesion, the brain, in each individual, sends to the organs an infinite diversity of its impressions, which are the reflexion of what passes in it.

The functions of the organs of the senses have been changed in some cases, though the nerves appertaining to them were not comprised in the cancerous degeneration. Nothing can be more remarkable in this respect than a case published in a periodical regarding a girl seventeen years of age who lost successively the use of all her senses, and in whom motion was at the same time destroyed, whilst in the midst of all this disturbance the intellect remained sound.

In three cases of cancer of the pituitary gland, which have been published, there was amaurosis; but this circumstance depended no doubt on the participation of the optic nerves in the disease.

In one of these cases, the first symptom had been a gradual weakening of vision accompanied by acute pains in the forehead.

* No doubt at each menstrual period the modification experienced by the uterus is felt through all parts of the system. Numerous facts might justify this assertion: here is a striking example of it: — We know a lady in whom, at the return of the menses, the skin of one of her arms, which has the mark of a cautery, reddens and becomes the seat of very severe itching.

For three years nothing else was observed; there then came on stupor, more and more profound, in which the patient died.

With respect to the life of nutrition, nothing particular is observed. In some individuals, obstinate vomiting has been observed, a phenomenon which is found in a certain number of cerebral affections, acute or chronic, very different from each other.

The pale yellow tint of the face is not here more constant than in other cancerous diseases.

Nothing is more variable than the duration of cerebral cancer. At times some months only elapse between the appearance of the first symptoms and death; sometimes these symptoms are prolonged for several years before the fatal termination. The latter may come on in two ways: either the signs of an acute encephalitis are evinced, and the individuals die either of coma, or of convulsions, or else they waste away gradually; their strength is lost, all their functions become deteriorated; intervening inflammations attack the lung, or the primæ viæ; eschars form on the skin, and death is the result of all these combined causes of destruction.

The following cases collected by ourselves, may be added to those which have been already published.

Case 1.—Pain of the head of long standing limited to one side of the cranium—Hemiplegia—Intermitting symptoms of cerebral congestion—Cancer in the right hemisphere.

A man, fifty-eight years of age, of a strong constitution, felt for the first time, fifteen years since, an acute pain which spread from the right temple over the entire right side of the head and face. This pain remained during six weeks. For some years following it returned several times without having any thing regular either in its returns or in its duration. It appeared two months ago with more violence than ever, and it soon became sufficiently intense to compel the patient to give up his occupation. A blister applied to the temple quieted him for some time. Having entered *La Charité* 15th November, 1821, the patient was in the following state: —

Countenance yellow, dejected; intellectual and sensorial faculties sound, except that there existed from time to time a temporary diplopia; muscular strength preserved; violent pains in the right side of the head, extending sometimes to the corresponding side of the face, becoming worse at intervals, so as to make the patient scream; sometimes lancinating, sometimes resembling a flame of fire passing through the head; right eye habitually weeping; pulse strong and slow; digestion and respiration natural. (Anodynes to the right temple, mustard pediluvia, blister to the nape of the neck.)

Though the state of the patient appeared nearly the same during the night the pain became insufferable. The 21st November, the patient having got out of the bed felt his legs bend under him, and he fell. The next day, 22d, his eyes were closed; he answered no questions. (Thirty leeches to anus, sinapisms, and purgative enema.)

The 23d, stupor; answers questions; right upper eyelid para-

lysed; right commissure of the lips drawn up; no voluntary movement in the extremities of the left side; no deviation of the tongue; preservation of the sensibility; pain of head much less. (Arnica, senna enema.)

From this period the preceding symptoms continued; the patient became rapidly debilitated; his features were altered; his countenance assumed a still more yellow tint; his pulse was soft, accelerated, and presented, besides, from one day to another, the greatest variations; the tongue was alternately brown and vermilion colour, dry and moist; several times the patient was found plunged into a profound coma, with a tracheal rattle, which seemed to announce his approaching dissolution. The day after, this rattle no longer existed or was much less, and the intellect was re-established; the patient no longer complained of head; he was in a state of apathy, or as it were indifferent to his situation; he resembled a person who had just got out of a profound sleep; his eye was closed and void of expression (blisters to the chest and leg, decoction of polygala, laxatives); the adynamic state went on; the stupor and rattle became continual; the extremities cold, and the patient sank.

Post-mortem. — The sub-arachnoid cellular tissue was infiltrated with a moderate quantity of serum. Viewed externally the convolutions of the right hemisphere seemed flattened. When cut in thin slices, to the level of the *corpus callosum*, the brain presented nothing remarkable, except that there flowed a considerable quantity of serum from each lateral ventricle. Anterior to the optic *thalamus* of the right side was a small softening of the size of a quarter of a dollar; there, the cerebral substance, slightly yellowish, was reduced to a diffluent pulp, but outside the right optic *thalamus* and the corresponding *corpus striatum*, there existed another species of alteration. For the extent of four fingers' breadth in length, and of two or three in breadth, there appeared a surface of a reddish grey, wrinkled, uneven appearance, presenting altogether the aspect of certain fungous growths of the dura mater. On cutting into this part, the scalpel encountered a resistance similar to that which schirrous growths of the stomach and liver oppose to it. Here there was found a tissue as it were areolated, of a bluish white, half transparent, very hard, and marked here and there with small cavities full of a liquid similar in appearance to apple-jelly (scirrhus in the state of crudity or softening). In other points there was seen a tissue of a dirty white colour, of considerable consistence, and traversed by reddish lines crossing each other in different directions.

In other points, in fine, nothing was found but a sort of reddish inorganic mass. This alteration prevailed, in depth, from the level of the optic *thalamus* to near the base of the skull. The cerebral substance, healthy around it, was connected to it by continuity of tissue. Parietes of the left ventricle a little hypertrophied.

Remarks. — We see in this case a violent hemicrania appear single, and unattended by any other ailment for several years, and thus isolated from every other symptom, assume all the characters

of a true neuralgia; it is, however, very probable that it depended on the organic lesion of which the brain was the seat.

The alteration of motion came on suddenly, as if the cerebral substance had become the seat of hemorrhage or softening. It is not in this way that the paralysis usually commences, which depends on a cancerous affection of the brain, and that is, no doubt, one of the most remarkable circumstances of this case. What is not less worthy of attention is, those species of periodical paroxysms, the probable result of an intermittent cerebral congestion, during which the patient sunk into a profound coma, presented the tracheal rattle of one in the last agony: the latter disappeared as well as the coma, the intellect was restored, and immediate death was no longer to be apprehended. This we observed several times; death came on at last in consequence of the continuance of a similar paroxysm.

Case 2.—Hemiplegia of long standing preceded by pains occupying the side of the cranium opposite to the paralysis—Mind sound; suddenly a violent attack of epilepsy, followed by profound coma, in which the patient died.

A man, forty-seven years of age, was affected with complete hemiplegia of the right side when he was seen by us. This person, who still retained all his intellect, told us that for the last three years he habitually felt in the left side of the cranium a pain which he attributed to rheumatism; he had had several attacks of this latter affection. The pain which he felt never entirely ceased; but though in general rather dull, it became occasionally much more acute, and then was accompanied by copious vomitings of a green substance. He considered this periodical exasperation of his headache a megrim.

For two years he experienced no other uneasiness but this pain of head, which did not, however, prevent him from attending to his usual avocations. At the end of this time, and after one of these megrims, which had been very violent, and which was continued beyond the ordinary period, he began to feel in the hand and foot of the right side an annoying formication, which went away of its own accord after some days. Two months after he had another attack of megrim as violent as the preceding, and after it the same sense of formication reappeared. But this time it continued, and the right extremities soon became weaker than those of the left side, and then completely paralysed. The paralysis was not complete till about eight months after the first appearance of the formication.

When we saw the patient he had constant pain of the head; the muscles of the face were the seat of slight convulsive twitches, resembling a sort of tic, which were not perceived by the patient. The extremities of the right side were completely deprived of motion, and the skin covering them was much less sensible than that of the extremities of the left side; the organs of the senses not affected; pulse sixty-eight, regular and full.

Ten or twelve days passed on without any change in the state of the patient. At the end of this time the pain of the head became suddenly aggravated; his features were very much altered by the

pain; he cried out aloud for some relief; he vomited during the time an enormous quantity of green bile; the pulse had become very frequent, and the muscles of the face much more violently convulsed than usual. In this state we were desirous to try the effect of a bleeding; sixteen ounces of blood were taken without any amendment. A little time after this the patient suddenly lost all consciousness, convulsive movements appeared, and all the phenomena characterising an epileptic attack were observed. The convulsions soon ceased, but they were succeeded by a profound coma, in which the patient died during the night.

Post-mortem. — A cancerous mass, the size of a pullet's egg, possessing the same characters as those described in the preceding case, occupied the central part of the left hemisphere of the brain; it had taken possession of the optic *thalamus* and *corpus striatum* of this side; the entire encephalic mass was very much injected. The organs in the other cavities was sound.

Remarks. — This tedious disease terminated by a violent attack of epilepsy, and commenced as that detailed in the first case, by a headache which for a long time did not appear connected with any serious lesion. Between these extreme periods we observe that a paralysis occurs, which is established gradually, and commences after one of the aggravations of the headache. The intellect continued more perfect here than in the subject of the first case. We shall see, on the contrary, the disturbance of this function very well marked in the subject of the following case.

Case 3.—Temporary signs of mental alienation—Intellect habitually very obtuse—Contraction of the extremities of the right side—Prostration of strength becoming greater, and death.

A woman, forty-eight years old, entered *La Charité*, with her intellect so dull that we could obtain no information respecting the previous history of her case. The questions put to her she answered very vaguely: she scarcely knew where she was. All we could learn from those who brought her was, that when she had her intellect, she suffered at different times from attacks of mania, for which she was admitted twice into the *Salpétrière*. By degrees she fell into a sort of idiocy, and it became necessary to attend her as a mere infant. She had also strong contraction of the upper and lower extremities of the right side. Since her admission, this woman was very much debilitated; tongue dry, and an eschar already formed on the sacrum. The following days the adynamic state became more and more marked, severe diarrhœa came on, the respiration stertorous, and the patient died shortly after.

Post-mortem. — The vault of the cranium had been hardly removed, and the dura mater cut into, when we were struck with the uneven appearance of the convolutions of the middle lobe of the right hemisphere; they were very much deformed, and very different from those of the opposite side. We found them very hard; they sounded under the scalpel. This unusual hardness extended

in depth to a little above the level of the *centrum ovale* of Vieussens, the optic *thalami* and *corpus striatum* not being at all affected. In every part where the cerebral substance was thus hardened, it was at the same time changed into a fatty (*lardacé*) tissue which had all the characters of scirrhus; in several parts it was marked by small cavities, which were filled with a greyish white substance, like glue. Three or four cretaceous tubercles, surrounded by a black indurated tissue, were found in the summit of the two lungs. The mucous membrane of the stomach presented a slate-coloured tint, and a greater consistence than natural in all the pyloric portion; towards the great curvature it was reddish and soft. The mucous membrane of the end of the ileum, and that of the cæcum, were very much injected without being softened.

Remarks. — Here is a case in which the symptoms of cancer of the brain are no longer the same, in some respects, as in the first and second case. At first, instead of simple paralysis, there was contraction of the limbs; but what particularly distinguishes this case from the two preceding ones is, the disturbance which the intellect underwent, namely, those temporary alterations of reason which terminated finally in a kind of madness.

In these three cases the nature of the lesion was identical; but it had not the same seat: in the two former the convolutions remained sound, in the third they were affected. And without intending to draw any general conclusions, we cannot help remarking that it was only in the case where the circumference of the brain participated in the cancerous degeneration that the intellecual faculties were affected.

It is not pathological anatomy that can here inform us, why, in the two first cases there was simple paralysis, and contraction in the third case. We cannot but remark, also, the entirely different manner in which death came on in these three cases. Here we observed no coma; no epileptic or other convulsions; we find mere prostration of strength gradually increasing, induced, in some degree, no doubt, by the state of the digestive tube.

Case 4.—Cancer of the brain, in the kidneys, and in several of the bones—Paralysis of one of the upper extremities—Headache—Remarkable state of apathy.

A man, forty-five years old, complained to us, when entering *La Charité*, of a pain in the left coxo-femoral articulation, the parts surrounding which were the seat of considerable swelling. We found also most of the signs of fracture of the neck of the femur; shortening of the limb; turning of the point of the foot outwards; inability to flex the thigh on the pelvis, the leg being extended on the thigh; the left great trochanter more projecting, and nearer the crest of the ileum than that of the opposite side; all motion of the joint impossible. The patient assured us he had not had a fall; that he never had suffered any external violence. The face had a very remarkable pale yellowish hue. Another phenomenon struck us, namely, complete paralysis of the whole left upper extremity.

The patient told us that he had insensibly lost the use of this limb; about six or seven months since, he perceived that he could not use it with as much ease as the other: from time to time he had experienced acute pains in it. He said that, for the last five or six months he was annoyed by an almost constant headache, principally seated in the right side of the cranium; he complained of no pain in any other part of the body. The digestive and respiratory functions were regular; the pulse was somewhat accelerated.

This man, who seemed to labour under an affection purely surgical complained of nothing: he scarcely answered the questions put to him; and we were struck every morning with the state of apathy in which he seemed to be sunk. In consequence of lying constantly on his back, his sacrum became excoriated; this excoriation was ultimately converted into a large ulcer, which went on increasing in depth and breadth. From this time he became weaker, his tongue dry and black, his teeth and lips were covered with dark coloured crusts. For the last twenty-four hours of his life, his respiration became remarkably slow; each inspiration seemed to be his last, so long was the interval between them, and he died.

Post-mortem. — We found the left optic *thalamus* and nervous substance surrounding it, changed into a lard-like tissue, possessing all the characters of cancerous matter. No other morbid change was found in the encephalon. A frothy, colourless serum flowed in great abundance from the two lungs. The mucous membrane of the stomach had for the greatest part of its extent a slate-coloured tint. The left kidney was occupied, for at least three-fourths of its extent, with a dull white tissue traversed by numerous reddish lines: being hard in certain parts, this tissue resembled in other parts softened cerebral substance; the degeneration of the parenchyma of the kidney into encephaloid tissue could not be mistaken. The same alteration existed in the right kidney, but to a less extent.

The head of the left femur was entirely separated from the body of this bone; in the place of its neck, the bony structure of which was entirely destroyed, there was found a half liquid substance, of a brick-red colour, similar to the reddish detritus resulting from the softening of the encephaloid tissue. A similar substance filled the interior of the head of the femur, which consisted merely of a hollow sphere with very thin parietes. It is probable that, in a little time more, it would have entirely disappeared. The upper extremity of the lower portion was marked with numerous asperities.

The third, fifth, sixth, and seventh ribs on both sides, presented several solutions of continuity; and in the place which should have been occupied by the destroyed bony tissue, there was found a reddish substance similar to that interposed between the head of the bone and its body. The sixth rib on the right side presented three similar solutions of continuity. On examining the bones of the cranium, we found that the right parietal presented at its anterior and middle part, an irregularly rounded perforation, large enough to admit the end of the thumb: this was filled by the same reddish matter

already described. This substance was spread over the dura mater to an extent at least three or four times greater than that of the perforation itself: beneath it the dura mater was sound. The first piece of the sternum was in a great measure changed into this same reddish substance.

Remarks. — Pain of the head, of several months' standing, but which was no longer exasperated at intervals as in the preceding cases; a paralysis gradually established, the existence of which could be ascertained only in the upper extremity opposite to the injured hemisphere; finally, towards the latter period of the disease, a remarkable kind of apathy: such were the only symptoms indicating in this individual cancer of the brain: but this cancer was only one of the elements of the disease under which he laboured. The reader's attention is directed to the appearance of this cancerous affection both in the bony system and in the urinary organs.

Case 5.—Cancer of the brain, liver, spleen, stomach, uterus, ovaries, and of a great number of lymphatic ganglions.

A woman, about forty years of age, presented nothing else during her stay at *La Pitié* but the ordinary signs of cancer of the uterus. With respect to the nervous centres she evinced no appreciable functional disturbance; she died of pleurisy of the right side which terminated in a sero-purulent effusion.

Post-mortem. — A small cancerous mass, the size of a pea, in the left *corpus striatum;* another, the size of a nut at the junction of the middle and posterior lobes of the right hemisphere; effusion into the right pleura; numerous cancerous masses in the liver and spleen; scirrhus thickening of the tunics of the stomach around the pylorus; cancerous degeneration of the body and neck of the uterus and also of the ovaries.

Remarks. — In this case, as in the preceding, the cancer found in the brain was but an element of a more general disease. The absence of cerebral symptoms may be accounted for by the small size of the cancerous masses found in the brain.

THIRD BOOK.

DISEASES OF THE CEREBELLUM.

These diseases are much rarer than those of the cerebral hemispheres. We collected but sixteen in a period of fifteen years of attendance in the hospitals. We will record them, and bring in juxta-position with them those already published by different writers; and will then endeavour to draw from the comparative study of these different cases, some consequences relative to the functional disturbances occasioned by lesions of the cerebellum.

SECTION I.

OBSERVATIONS ON HEMORRHAGE OF THE CEREBELLUM.

In the six following cases hemorrhage of the cerebellum alone existed three times; and three times it coincided with an effusion of blood into one of the cerebral hemispheres.

CASES.—Effusion of blood into the right hemisphere of the cerebellum—Hemiplegia on the left side, accompanied with loss of consciousness—Death fifty hours after the appearance of the first apoplectic symptoms.

A female, twenty-one years of age, was treated at *La Charité* for a chronic gastritis, of which she evinced symptoms for the last two years. One evening at six o'clock, a little time after having eaten, and before going to bed, she fell, suddenly deprived of consciousness and motion; after about an hour she recovered the use of her senses, but could not move the extremities of the left side. On seeing her the next morning her state was as follows: — Face injected equally on both sides; contraction of the pupils; vision preserved; air of stupor; she answers questions with correctness; no embarrassment of speech. The two extremities of the left side completely deprived of voluntary motion; they presented no trace of contraction; sensibility of the skin covering them impaired. Pulse seventy-five and full; heat of the skin natural; respiration hurried (thirty to thirty-four every minute). This girl seemed to us to have been struck with cerebral hemorrhage; she was bled to sixteen ounces.

At the following visit her state was much worse; she was sunk in a profound coma; does not any longer answer questions; skin insensible to the action of excitants, on the right as well as on the left side. The extremities of the right side, when raised, sustain themselves for some seconds in the air, and fall back gradually; not so the extremities of the left side, which fall like inert masses; respiration very stertorous. In the course of the day the symptoms of carus became more and more marked, and the patient died at eight o'clock at night.

Post-mortem. — *Cranium.* — Sub-arachnoid cellular tissue of the convexity of the cerebral hemispheres very much injected. The latter present no appreciable alteration except considerable sandiness of their tissue. In the central part of the right hemisphere of the cerebellum was found an effusion of blood, which formed in the nervous substance a cavity large enough to hold a pullet's egg. Around this cavity the tissue of the cerebellum was red and softened for the space of three or four lines.

Thorax. — Sero-sanguinolent infarction of the two lungs, and particularly of the left. Heart and its appendages natural.

Abdomen. — Scirrhous induration of the sub-mucous cellular tissue of the stomach in all its pyloric portion. Beneath this tissue considerable hypertrophy of the muscular tunic, which was divided into large fasciculi by whitish lines belonging to the thickened cel-

lular tissue. In some parts, no trace of the fleshy tunic, and there is nothing found but a homogeneous scirrhous mass. The mucous membrane of a slate-colour hue, and thickened.

Case 2.—Hemorrhage into the right hemisphere of the cerebellum—Sudden loss of consciousness—Hemiplegia on the left side—Death very rapid.

A man, thirty-eight years of age, entered *La Charité* in the course of the month of March, 1824, presenting all the symptoms of an organic affection of the heart. A well-marked bellows sound was heard at each contraction of this organ. After complaining for some days of dizziness and headache, the precise seat of which he was unable to point out, he was struck with a violent fit of apoplexy: coma, sudden and profound; general insensibility to external stimulants. As yet, no real paralysis except on the left side: if the limbs of the right side be raised, they fall again but slowly; if those of the left side be raised, they fall suddenly, as inert masses. On pinching the skin severely, the extremities of the right side are seen to move, at the same time that the muscles of the face contract, and a slight moan is heard; on the contrary, the extremities of the left side are immoveable.

Such was the state in which we saw the patient at our visit, about fifteen hours after the attack; the respiration was very stertorous; pulse not frequent, but compressible; it presented many irregularities; this state appeared to us to be connected with the affection of the heart. He died a few hours after the visit.

Post-mortem. — *Cranium.* — No appreciable lesion in the cerebral hemispheres, nor in the membranes covering them. Right hemisphere of the cerebellum transformed into a sort of pouch filled with black blood similar to currant-jelly.

Thorax.—The heart presented an unusual size, depending on the abnormal state of the auricles; they were both considerably dilated, and their parietes very much hypertrophied; the right auriculo-ventricular valve was hard and thickened, particularly at its free edge. In the left, the mitral valve was still more thickened, cartilaginous in some points, and bony in others. It constituted a ring or immoveable diaphragm, through the opening of which the index finger could scarcely be introduced. The aortic valves were ossified at their base. The ventricles preserved their normal state.

Case 3.—Effusion of blood into the left hemisphere of the cerebellum—Hemiplegia on the right side—Intellect dull—Subsequently a fall—State of coma—Death.

A woman, seventy-five years of age, entered *La Charité* in the following state: — Countenance pale, expressive of stupor; the intellect very dull; complete paralysis of the extremities of the right side; tongue dry and brown; diarrhœa; pulse frequent; skin hot. We obtained no information of the preceding history.

For the five or six following days no change took place. At the end of this time, the patient, wishing one morning to leave her bed,

fell, and was deprived of consciousness; from that time there was coma; general relaxation of the limbs; death two days after the fall.

Post-mortem. — *Cranium.* — Pia mater covering the convexity of the cerebral hemispheres was infiltrated with serum; there was a great quantity also in the ventricles.

Clots of blood filled the occipital fossa of the left side; this blood escaped through a rent which was perceived in a point of the external posterior part of the circumference of the left hemisphere of the cerebellum. By pressing on this hemisphere, more was made to flow from it. The rent just alluded to led us by a canal which was fistulous, short, and filled with blood, in the midst of a cavity formed in the substance of the lobe of the cerebellum itself, and large enough to admit at least a large nut. This cavity contained black blood, half liquid, half coagulated. Its parietes were lined by a reddish membrane of about a line in thickness, easily detached from the subjacent tissue. Around this cavity the substance itself of the cerebellum was not softened, and had not undergone any alteration.

Thorax. — Considerable infarction of the lungs. Hypertrophy of the parietes of the left ventricle of the heart; some points of ossification towards the adherent edge of the sigmoid valves of the aorta.

Abdomen. — Reddish softening of the mucous membrane of the stomach towards its great curvature. The cavity of the uterus filled with blood, and the tissue of the body of this organ intensely red.

Case 4.—Double effusion of blood: one into the left hemisphere of the brain, and the other into the left hemisphere of the cerebellum—Hemiplegia on the right side.

A man, sixty-three years old, was struck, on leaving the table, with an attack of apoplexy. He was brought the same evening to *La Charité*. When we saw him the following morning, he had partly recovered consciousness; he understood the questions put to him, but answered stammeringly, and in a way almost unintelligible. The left commissure of the lips drawn up; we could not prevail on him to put his tongue out. Right eyelid more depressed than the left; sensibility of the two sides of the face apparently equal; sees equally well with both eyes; arm and leg of the left side capable of motion of every kind, but the extremities of the right side remained immoveable: all possible positions were given them, without the slightest resistance being made; the skin covering them felt less acutely than on the other side. Respiration high and frequent (bleeding to sixteen ounces, purgative mixture, sinapisms to the lower extremities).

The following morning we found the patient in the same state. Blood drawn not buffed; purgative acted well (thirty leeches to the neck, blister to each thigh).

During the day new symptoms appeared. The patient, who, till then, had remained in a state of apathy, began to be very much disturbed, and to rave; he cried and spoke incessantly. Towards evening he fell into a state of coma and died in the night.

Post-mortem. — The pia mater, covering the convexity of the

hemispheres, was very much injected; this injection more marked on the left than on the right side. The grey substance of the convolutions showed a well-marked rose-coloured tint. About one inch below the convolutions of the left hemisphere of the brain, there appeared an enormous cavity filled with black blood half coagulated; this cavity terminated on the level of the *centrum ovale* of Vieussens; it occupied all the middle lobe, and a little of the exterior and posterior lobes. Around it the cerebral substance was, as it were, ecchymosed for a space of four or five lines; it lost its consistence only for the space of one or two lines from the cavity; no membrane lined the parietes of the latter. No other lesion existed in the cerebral hemispheres; much serum accumulated in the ventricles.

A second effusion of blood existed in the centre of the left hemisphere of the cerebellum. The accidental cavity produced by it might admit a nut; around it the tissue of the cerebellum was considerably injected without being softened. However, a stream of water poured on the thin parietes of this cavity, displayed there a great number of red or whitish filaments, resulting from the tearing of the nervous substance.

Case 5.—Two attacks of apoplexy; three months intervening between each—Hemiplegia of the right side after that of the first attack—Apoplectic cyst in the left hemisphere of the cerebellum—Recent hemorrhage in the right hemisphere of the brain.

A woman, aged sixty-seven years, had had an attack of apoplexy two months and a half before entering *La Charité*. After this attack, of which the symptoms could not be narrated to us with sufficient precision, she remained paralytic on the right side. When we first saw her, motion was entirely abolished in the two extremities of this side, and their sensibility impaired; intellect and speech ready; the senses not affected. After remaining fifteen days in the same state, she was struck with a second attack of apoplexy, of which she died in the course of some hours.

Post-mortem. — An immense effusion of blood into the right hemisphere of the brain; it took possession of the optic *thalamus, corpus striatum*, and a considerable portion of the nervous mass above and external to these parts; the effused blood has the colour and consistence of currant jelly; the effusion evidently quite recent.

In the left hemisphere of the cerebellum, on the contrary, was another lesion of an older formation, indicating that an old hemorrhage had taken place in this part. The cavity here is large enough to admit a nut, and contains a clot of blood of a brown red colour, and solid, around which was formed a membrane entirely resembling a serous one: the adjoining substance of the cerebellum is a little soft and yellowish.

Case 6.—Double hemorrhage, one of which is in the right hemisphere of the cerebellum, and the other in the left hemisphere of the cerebrum—Hemiplegia on the right side—Loss of consciousness.

A hotel-keeper, forty-nine years of age, fell in the street deprived

of consciousness, after having indulged in excessive drinking. He was instantly conveyed to the *Maison de Santé*, and was bled to a considerable amount. For the first hour after the bleeding there seemed some return of consciousness, which, however, was soon again succeeded by profound coma.

The following morning when we saw him, he was in a state of stupor from which nothing could arouse him; the strongest pinching seemed to have no effect on him; vision gone: the loudest noises near his ear produced no movement in him; the four extremities were immoveable, in a state of relaxation, and seemed as incapable of motion on one side as on the other. Still we were assured that the evening before, after being bled, he moved the extremities of the left side with ease, whilst those of the right side seemed paralysed; face red, and injected; pulse hard and frequent; skin hot. We had him bled again to twenty ounces, and ordered twenty leeches to be applied after the bleeding to each mastoid process, which were let bleed the entire day, whilst a bladder full of ice was applied to the head, and sinapisms to the lower extremities.

Towards the end of the day the patient emerged from his state of coma; he seemed to recover a little intellect. When we saw him again his eyes were open, and he seemed to pay some attention to the questions addressed to him; however, he seemed not to understand them, and did not answer. The left angle of the commissure of the lips was drawn back, and the tongue when put out of the mouth inclined to the right. He moved the left extremities with ease; those of the right side was completely deprived of motion, and the sensibility of the skin covering them was very much impaired; the pulse was slow; the respiration hurried, but not stertorous; neither was it the preceding day. (A blister was applied to the nape of the neck, ice to the head still continued.)

In the course of the day the patient relapsed into coma, and he died in the night. Up to the last moment he had the power of moving the extremities of the left side.

Post-mortem. — A large effusion of blood occupied at least the third of the left cerebral hemisphere; it commenced a little beneath the convolutions, which were sound, and affected the optic *thalamus* and *corpus striatum;* it made its way into the left lateral ventricle. The *septum lucidum* was not torn.

A second effusion of blood was discovered in the right hemisphere of the cerebellum, and occupied the half of this hemisphere; it was nearer to the upper than the lower surface.

Remarks. — In the six preceding cases, the hemorrhage of the cerebellum differs in nothing, with respect to the symptoms, from hemorrhage of the cerebrum.

In all these there is paralysis, and it occurs on the side opposite to that on which the effusion of blood takes place, except in the last case, which forms an exception. From these facts, we feel warranted in concluding that irritation of the cerebellum passes to the opposite side of the body, as do those of the brain, and yet the

fibres of the spinal marrow which enter into the *corpora restiformia*, do not come from the opposite side of this cord. The argument which had been considered available to explain the crossing influence of the brain, is no longer so here.

The intellect presents in its disorders the same varieties as in the cases of hemorrhage of the brain; so that these disorders seem to depend less on the seat of the lesion than on its intensity.

The sensibility undergoes no peculiar aberration: it is merely impaired or destroyed, as in cases of cerebral hemorrhage.

With respect to the genital apparatus, it presents nothing remarkable, except in the woman who forms the subject of the third case.

In her there was considerable congestion of the uterus. We satisfied ourselves that in the males there was no erection of the penis, because they were entirely uncovered, and were examined naked, in order to ascertain the state of the lower extremities.

The disease begins the same way as in the individuals whose brain, properly so called, is the seat of hemorrhage. Thus we see our patients fall suddenly deprived of consciousness, and become at the same time struck with paralysis.

Let us now add to these six cases observed by ourselves, those others of hemorrhage of the cerebellum published up to the present time.

We have found in medical authors twenty-two cases of hemorrhage of the cerebellum, nine of which were in the middle lobe, and thirteen in the lateral lobes.

Of the nine cases relating to hemorrhage of the middle lobe, six have been published by M. Serres.* In these six cases, all the signs of violent apoplexy were observed; nothing particular is mentioned regarding the disturbances of motion.

A seventh case of hemorrhage of the middle lobe has been mentioned by Dance,† in his paper on acute hydrocephalus. The subject of this case was struck with apoplexy; no account is given of the movements of the limbs.

An eighth case, relative to this hemorrhage, was published by M. Bayle. The patient suddenly lost consciousness, but he was not paralysed; at least, M. Bayle assures us, that he drew back his limbs instantly when they were touched. This individual died comatose on the fifth day of his attack, after having exhibited, on the third day, convulsive movements in the lower extremities, and some rigidity towards the nape of the neck.

We read in the *Clinique des Hôpitaux* (tom. i. No. 70), a case of M. Guiot, in which there is not found, as in eight others, any other lesion than an effusion of blood into the middle lobe of the cerebellum. The subject of the case had an attack of apoplexy. Before he was struck, he walked unsteadily, and, after the attack, he remained hemiplegic on the left side.

* Anatomie du Cerveau, tom. ii.
† Archives de Médecine, Jan. 1830, p. 42.

Thus, then, in these nine cases of hemorrhage of the middle lobe of the cerebellum the paralysis is absent once; it is limited to one side in another case; in the seven other cases, the limbs seem to be in a general state of relaxation, as happens in large cerebral hemorrhages.

In these nine cases the intellect and sensibility present the same modifications, as they would have presented if the hemorrhage were seated in one of the cerebral hemorrhages.

The genital apparatus is, on the contrary, modified very particularly in seven of these nine cases, whether male or female.

First, in the male, M. Serres saw five times (the subject of his sixth case was a female) the phenomenon of erection coincide with hemorrhage of the middle lobe. This same phenomenon was noted in the case published by M. Guiot. Still further, in this case, the patient, before the attack, was attacked by continual erections, and frequent pollution.

The female who formed the subject of M. Serres' case was seventy years of age. Her *menses reappeared* at the time she was struck with apoplexy; and after death her uterus was found filled with blood, and the tubes and ovaries considerably injected.

We shall now pass on to the analysis of the thirteen cases, where the hemorrhage took place in one of the hemispheres, or of the lateral lobes of the cerebellum.

These cases, as also the six already cited, may be divided into two series: in the first, the hemorrhage of the cerebellum exists without cerebral hemorrhage; in the second, these two kinds of hemorrhages co-exist.

The first of these series comprises seven cases: in three of them only is there paralysis, and in all three it took place on the side opposite to the seat of the effusion into the cerebellum. Of these three cases, two were seen by M. Serres. The right hemisphere of the cerebellum was the seat of the hemorrhage, and there was hemiplegia of the left side.*

The third case was published by Dr. Cazes in his Thesis.† The subject of his case was a female, seventy-four years of age, who, after having had for some time a great tendency to stupor, lost consciousness quite suddenly, and fell into a profound carus. When the extremities were pinched severely, those of the left side were seen to perform considerable movements; the right lower extremity continued entirely motionless; the upper extremity of the same side moved, but in a manner almost imperceptible. This woman died eight hours after having been struck. On examining the body, M. Cazes found the left lobe of the cerebellum changed into an immense cavity filled with coagulated blood.

In the four other cases of hemorrhage of the cerebellum, without co-existence of cerebral hemorrhage, there is no mention of hemi-

* Anatomie Comparée du Cerveau, tom. ii. p. 215.

† Essai sur la Paralyse, par Felix Cazes, 1824, No. 3.

plegia. Thus one of these four cases recorded by Morgagni,* refers to a man, who was found dead, with the upper extremities strongly contracted; there was an effusion of blood into each of the lateral lobes of the cerebellum.

Another of these cases was attended by Dr. Sedillot,† and was of a child seven years old, who, after being exposed to a burning sun, was suddenly seized with acute pains towards the occipital region: he died a quarter of an hour after the appearance of the pains. An effusion of blood was, in this case, in the centre of the right lobe of the cerebellum.

A third case, reported by Dr. Cafford,‡ contains so few details, that it can be of no use in solving the question now before us. It is merely said, in this case, that in an individual who *died of apoplexy, blood was found effused on the surface of the cerebellum and into its grey substance.*

With respect to the fourth case, published by Dr. Michelet in his Thesis,§ it is deserving of all our attention.

This was the case of a girl eighteen years of age, who, two years before her death, had had an attack of apoplexy, the result of which was *amaurosis without any other paralysis,* and habitual headache. An apoplectic cavity of an old standing was found in the right lobe of the cerebellum.

Let us now pass to the cases in which there was, at one and the same time, hemorrhage into the cerebellum and the cerebrum. Eight cases of this kind have been published.

In one of these cases only the effusion of blood took place into the hemisphere of the cerebellum and cerebrum of the same side; it was on the left, and there was observed a hemiplegia on the right, the left extremities retaining all the freedom of their movements.‖

In the seven other cases it was in the opposite hemispheres of the cerebrum and cerebellum that the hemorrhages took place.

Thus, there was observed, in the wards of M. Piorry, the case of an individual, who had at first an attack of apoplexy, with hemiplegia on the right side; a year after he had a second, but this time it was the extremities of the left side which were paralysed. To account for these two successive paralyses, M. Piorry found two lesions, the one, an old one, in the left lobe of the cerebellum; it was an old apoplectic cyst: the other recent, in the right lobe of the cerebrum; it was a softening.¶

In this case the crossing influence of the cerebellum on motion is quite evident, and the successive manner in which the hemorrhage

* De Sedibus et Causis Morborum, Epist. ii. § 22.

† Bibliothèque Médicale, tom. xlii.

‡ Archives Générales de Médecine, tom. xxii.

§ Essai sur les Rougeurs de la Substance Cérébrale, Thesis de la Faculté, 1827, No. 59.

‖ Chambeyron, Dissertation Inaugurale, 1823.

¶ Lancette Française, No. du 17th Octobre, année, 1829.

took place in the cerebellum, and cerebrum, allows us accurately to appreciate the influence of each of these parts.

In the other cases, of which we are now to speak, an extraordinary fact presents itself; it is the existence of paralysis only on the side of the body opposite to the cerebral hemisphere which was the seat of hemorrhage, whilst the extremities on the side opposite that to the diseased lobe of the cerebellum remained sound.

Two of these cases were published by Dr. Droullain.* In one of them there were two old apoplectic cysts, the one in the left lobe of the cerebellum, the other in the middle and external part of the right hemisphere of the cerebrum; there had existed a hemiplegia on the left side. In the other case, there was found, in the midst of the left lobe of the cerebellum, a sanguineous effusion the size of a nut, and at the same time there was discovered in the right hemisphere of the cerebrum, between the *optic thalamus* and the *corpus striatum*, the traces of an old hemorrhage; the patient had recently had hemiplegia on the left side. After a fall he exhibited symptoms referrible rather to an acute meningitis than any other affection; alternations of delirium and somnolence; temporary contraction of the extremities of the two sides; convulsive movements of all the body; retroversion of the occiput.

The different facts which we have now recorded, lead us to the same results as those derived from our own experience.

From both series we may draw the following corollaries: —

1st. When the effusion which has taken place into one of the hemispheres of the cerebellum is sufficiently extensive, without being inordinate, it produces paralysis of one side of the body.

2d. The side of the body paralysed is that which is opposite to the hemisphere of the cerebellum, in which the hemorrhage had taken place. This fact has been ascertained both in the cases of simple hemorrhage of the cerebellum, as also in those where there was at the same time hemorrhage of the cerebrum and cerebellum of the same side, or, in other cases, where the hemorrhage of the cerebellum had preceded that of the cerebrum, both taking place in the opposite hemispheres. M. Piorry's case exemplifies it.

3d. Hemorrhage of the cerebellum does not produce hemiplegia, at least that we could discover, in the cases where there was a very severe attack; in the latter there is observed a general relaxation of the four extremities, such as takes place also in the cases of abundant cerebral hemorrhage.

4th. When the hemorrhage of the cerebellum occurs simultaneously with that of the cerebrum, or a little time after it, but so that the blood is effused on the right into the cerebellum, and on the left into the cerebrum, or *vice versâ*, there is paralysis only on the side of the body opposite to the hemisphere of the cerebrum in which the hemorrhage has taken place, that is, on the same side as the hemorrhage of the cerebellum. How then does it come to pass that,

* Droullain, Dissertation Inaugurale.

whereas the movements of the extremities of the right side are abolished in consequence of an effusion of blood into the left hemisphere of the cerebrum, the effusion which takes place simultaneously into the right hemisphere of the cerebellum, has no longer the power of paralysing the extremities of the left side? It had this, however, in the cases where the brain remained sound; and is not that a fact worthy of attention?

5th. It is not satisfactorily proved that the contraction of the limbs, convulsions, retroversions of the head, which have been observed in a case where there was simultaneous hemorrhage into the brain and cerebellum, depend on lesion of the latter. Have not similar phenomena been observed, in fact, in cases of simple hemorrhage of the brain?

6th. Sensibility, placed by some authors in the cerebellum, has not seemed to us to suffer a special or particular lesion in the cases of hemorrhage of the organ.

7th. The intellect presents the same modifications as when the effusion of blood has taken place into the brain properly so called.

8th. In none of the cases analysed by us, respecting hemorrhage of one of the lateral lobes of the cerebellum, no particular phenomenon presented itself with respect to the genital organs.

9th. The functions of the life of nutrition exhibited no modification different from those presented in individuals who have had hemorrhage of the cerebrum.

SECTION II.

OBSERVATIONS ON SOFTENING OF THE CEREBELLUM.

Softening of the cerebellum has been observed much less frequently than that of the cerebrum; up to the present time there have been but thirteen cases published, to our knowledge; eight of these refer to softening of one of the lateral lobes, four to softening of the two lobes together, and one only to softening of the middle lobe. Among these thirteen cases there are but nine in which the cerebellum alone is affected; in the four other cases there is at the same time an affection of the cerebrum twice, of the pons Varolii once, and of the spinal marrow once. We have ourselves met but four cases of softening of the cerebellum; we shall now record them.

CASE 1.—Pain of the head in the occipital region of three months' date—Hemiplegia of the left side established gradually—Laterally convulsive movements of the paralysed limbs—Blindness—Considerable softening of the right lobe of the cerebellum.

A seamstress, thirty-one years old, had always enjoyed good health. About six weeks before entering *La Charité*, she experienced a fright whilst menstruating: the menses were suppressed, and immediately after their disappearance, she was seized with diz-

ziness, and an acute pain in the back part of the head towards the right side. The dizziness disappeared after bleeding, but the pain of head remained; it was unconnected with any other symptom for eight days; subsequently the patient began to experience an annoying sense of formication at the ends of the fingers of the left hand; she could use this hand but awkwardly, and was astonished at seeing what she handled with it always to fall; she soon became unable to work with it; the entire arm seemed very heavy. After some time, the lower extremity of the left side became weaker, and in about a month the patient had complete hemiplegia of the left side. But at the same time that the patient thus lost the power of motion of one of the sides of the body, her sight, till then quite good, became very imperfect, and five weeks after the appearance of the first symptoms, she became completely blind.

This was the state in which we first saw her — deprived of sight, and of the power of moving the limbs of the left side; then the pain of the head became less acute. The patient, however, still felt it, and referred it to the lower part of the occipital region of the right side. The paralysed limbs were flaccid, and were moved passively in all directions, the skin covering them still retaining its sensibility; no trace of paralysis on the face; the pupils, moderately dilated, still contracted on the sudden approach of light; the appearance of the eyes natural; there was, however, complete blindness; she could scarcely distinguish day from night; intellect sound, the pulse natural; the menses had not reappeared since they were suppressed by the fright. Leeches were first applied to the nape of the neck, then to the genital organs; aloëtic pills were frequently given, and subsequently the back of the head was covered with a blister.

No change appeared for the first three weeks of her stay in the hospital; then, without any known cause, the pain of head suddenly became more violent, and extended to the entire cranium: the extremities of the left side, which hitherto had remained entirely immoveable, were several times agitated with convulsive movements which were slight in the lower extremity, but very violent and almost continual in the upper limb; acute pains accompanied these convulsions; the intellect soon became disturbed; complete delirium set in; for twenty-four hours the patient spoke, and became agitated incessantly; she then fell into a profound coma, in which she died.

Post-mortem. —The pia mater which extended over the convexity of the cerebral hemispheres was very much injected, as was also that covering the hemispheres of the cerebellum. The substance of the brain, properly so called, was marked with a considerable number of red points, and presented no other lesion; the lateral ventricles distended with a great quantity of limpid serum; the *fornix* and *septum lucidum* natural. Externally the cerebellum appeared healthy: but we had scarcely removed some layers of the substance of its right hemisphere, proceeding from above downwards, when we found an immense cavity, where this substance,

deprived of its normal consistence, was changed into a greyish mass: this softening occupied at least two-thirds of the right hemisphere of the cerebellum; it partly attacked the prolongation which go from the cerebellum, either to the spinal marrow, or to the *tubercular quadrigemina*, or to the annular protuberance; it did not extend as far as the lower surface; in no part of its extent was there either injection or infiltration.

Remarks. — This softening, seated in one of the hemispheres of the cerebellum, and occupying a considerable portion of it, presented in its symptoms and progress the greatest resemblance to softenings of the brain. Here again, as in the cases of hemorrhage of the cerebellum cited above, the paralysis existed on the side opposite to that on which the softening existed. There was neither in motion nor sensation any special disturbance connected with the functions attributed to the cerebellum by some physiologists. The intellect to be sure retained all its integrity; but was it not also found to be sound in more than one case of softening of the brain? The seat of the pain alone could incline us to suspect that of the disease. With respect to blindness, it seems at first that it has nothing to do with diseases of the cerebellum, and yet this case is not the only one in which different affections of the cerebellum have been affected by a loss of vision. May this fact be explained by the anatomical relations established between the cerebellum and the *tubercula quadrigemina* by means of the prolongations known by the name of *processus a cerebello ad testes?* The symptoms which supervened during the latter period should not, in our opinion, be connected with softening of the cerebellum: they depended on a complication, and we think that we may refer them to the bright red injection presented by the meninges, as well as to the great quantity of serum contained in the ventricles.

We know of but few cases in which a softening of the nervous centres succeeded in so marked a manner to a moral impression: the latter had at the same time the effect of suppressing the menses, and it is a remarkable coincidence that in this particular case where there was disturbance in the performance of a function assigned to the genital organs, the same cause which produced this disturbance exercised its influence also on the cerebellum.

Case 2.—Pain of head in the occipital region—Hemiplegia of the right side with contraction—Intellect preserved—Attack of apoplexy of which the patient died—Softening of the central part of the left lobe of the cerebellum—Hemorrhage in the cerebral hemisphere of the left side.

A labourer, fifty-three years of age, told us, when entering *La Pitié*, that for the last two months he felt a pain towards the posterior and inferior part of the cranium; it existed both on the right and left sides: he lost by degrees the power of moving the extremities of the right side, and recently the paralysis of these extremities was complicated with considerable contraction. The sensibility was retained in the paralysed limbs; motions of the face not changed: intellect entire.

This patient presented no change in his state; only he complained from time to time of feeling dizziness, for which he was bled, and also took some gentle laxatives, and had revulsives applied to the lower extremities. One morning he told us that, from the preceding day, his dizziness of head was much more severe than usual; the face was very much injected; he no longer saw all objects, but through a sort of cloud, and his speech became stammering; he added that this habitual pain in the back part of the head extended over the entire cranium. Sixteen ounces of blood were taken from him, without any benefit; in the course of the day the vertigo went on increasing; and towards four o'clock in the evening he fell deprived of consciousness. On the following morning he presented all the symptoms of an attack of apoplexy; entire loss of intellect; profound coma; general insensibility respiration stertorous; he died in the evening.

Post-mortem.— General injection of the meninges; rose-coloured hue of the grey substance of the convolutions. An effusion of blood occupied the middle part of the left hemisphere of the cerebrum; the *corpus striatum* and optic *thalamus* were affected by it, and the blood forced its way into the corresponding lateral ventricle. *Septum* sound; no appreciable alteration in the right cerebral hemisphere; we were astonished at this; as we here sought for the cause of the old hemiplegia of the left side, and of the other symptoms experienced previously to the recent attack of apoplexy. This cause, however, existed elsewhere; in the centre of the left hemisphere of the cerebellum we found a yellowish softening about the size of a nut. In some points this softening exhibited a reddish tint; around it the substance of the cerebellum was not more injected than elsewhere. Considerable infarction of the lungs.

Remarks. — This case resembles the preceding in several respects; the commencement was the same, as were also the symptoms. In both cases the intellect was sound; in both the power of motion was lost in the limbs opposite to the hemisphere of the cerebellum in which the softening was, and in both the hemiplegia was established gradually; but in the first case there was but mere paralysis; in the second there was at the same time contraction of the limbs; and in this latter alone did some of the softened points exhibit a red tint. In these two cases, in a word, there existed pain of the head at the commencement, the seat of which corresponded with that of the disease. Here, however, there was not blindness as in the first case. Was this because the softening was less extensive, and because also it affected particularly the portion of the lobe of the cerebellum which is especially related to the *tubercula quadrigemina?*

There is another point of resemblance between these two cases with respect to the manner in which the disease terminated. In both it was of the brain affection that the patients died; there having been congestion of this organ in the first, and in the second a hemorrhage which was itself preceded by cerebral hyperemia,

that did not yield to bloodletting. It is remarkable that the apoplectic attack occurred a few hours after the bloodletting.

Case 3.—Sudden loss of consciousness, and of motion of the extremities of the left side—Re-establishment of the intellect—At the end of nine days, a new attack of apoplexy, and death—Considerable softening of the right hemisphere of the cerebellum.

A shopkeeper, twenty-nine years of age, was in the habitual enjoyment of good health. One morning, having breakfasted as usual, and being engaged in his shop, he suddenly uttered a loud cry, put up his hand to his head, and fell to the ground deprived of consciousness. For the first few minutes after this, his four extremities were agitated with convulsive movements, which subsided, and the patient remained in a stupor: he was bled. After about three-quarters of an hour, the stupor ceased; the patient came to himself; he recovered his consciousness; speaks freely; has no recollection of what is just past; but the entire left side of the body was deprived of motion. Thirty six hours after the attack, he was removed to the *Maison de Santé*, and presented the following state: —

Face pale; complete paralysis of the two extremities of the left side; no contraction of the limbs; diminution of the sensibility in the paralysed limbs; mind clear; speech free; no pain of the head; pulse free from frequency; respiration natural.

Hemiplegia was, in this case, the only marked symptom; during the following week no new symptom was observed; but at the end of this time the severe symptoms exhibited by the patient, at the commencement of his disease, reappeared: the same loss of consciousness; the same convulsive movements, which were of short duration; but the stupor which succeeded them was not temporary, as at first; it became, on the contrary, more and more profound; the respiration was laboured, and the patient died in a state of coma.

Post-mortem. — We found in the nervous centres no other change than considerable softening of the right hemisphere of the cerebellum. More than two-thirds of this hemisphere were converted into an inorganic mass, the colour of which varied according to the points examined. The softened mass presented in no part any effused blood.

Remarks. — This case differs from the two preceding, both in the nature of the symptoms, and in their mode of development. Here, in fact, the paralysis was established suddenly: it attained all at once its highest degree of intensity; the disease commenced by a complete loss of consciousness, accompanied with convulsions. At first it might have been taken for a fit of epilepsy, and what would have strengthened one in this opinion was, that at the end of a very short time the intellect returned, without the patient retaining any recollection of what had passed. All that remained of the serious symptoms was the hemiplegia; but we have more than once seen epileptic patients, who, after each fit, also remained paralysed on

one side of the body for a certain time. This hemiplegia still continued in all its intensity, when, at the end of eight or nine days, there came on a second attack, which, also, in its symptoms very much resembled those of epilepsy. This second attack was fatal. Nothing certainly in this case could have enabled us to foresee the seat of the morbid change which caused all these symptoms: even the pain of the occipital region was here wanting, which existed in cases 1 and 2.

Case 4.—Pain in the occipital region—Convulsive agitation of the limbs—Difficulty of respiration—Softening of the left hemisphere of the cerebellum.

A groom, aged nearly forty years, had always enjoyed good health, when he was seized with violent pain of head, accompanied with dizziness: a bleeding, a few days after, diminished, without however removing, these symptoms, and he remained the fifteen days following with headache, vertigo, and a feeling of debility which prevented him from working as usual; his appetite, also, was somewhat impaired. After this time a more serious state suddenly set in; the pain which till then occupied the entire head, was concentrated towards the occiput, and became at the same time much more acute; he kept to his bed, and after having been bled again, he was conveyed to the *Maison de Santé*, where he presented the following state: —

He answered questions with some difficulty, as one who scarcely understood what was said to him; in other respects his answers were rational; when asked where he felt pain, he pointed his hand to the occiput, and more particularly towards the left side of this bone; he moved his four extremities with equal facility, and the sensibility in them was not changed. Vision was much weaker on the right than on the left; there was no difference, however, between the two pupils. Pulse not frequent. Thirty leeches were applied to the base of the occipital bone, and a purgative was administered.

The three days following, the patient was in a state of continual agitation; the motion of the limbs on both sides was at times so sudden and irregular that they appeared to be convulsive. He constantly complained of his head, and directed his hands incessantly to his forehead. The respiration, which was calm on the first day, became very much impeded; it was performed as it were in jerks, and it would appear that the muscles destined to execute this function participated in the convulsive movements of those of the limbs. He soon died in a state of asphyxia.

Post-mortem. — Meninges injected; nothing particular in the hemispheres of the cerebrum; a small quantity of serum in their ventricles; reddish softening of the left hemisphere of the cerebellum in its posterior and inferior half.

Remarks. — Here is a case in which the softening of the cerebellum presented itself to us with symptoms very different, in certain respects, from those observed in the three preceding cases.

Here there was no paralysis, and the only change noticed in the power of motion, was that singular and irregular agitation of the limbs, both on the right and left side. But here again we find the occipital pain which also existed in cases 1 and 2, and still further, vision was weakened in the eye opposite to the affected lobe of the cerebellum; an important fact, since we find it in several cases of affection of the cerebellum. Another phenomenon deserving of remark, was the embarrassment of the respiration. There was a direct influence exercised in this function, or, at least, on the muscles which serve to perform it, by the morbid state of the cerebellum.

The four cases now cited, bear a strong resemblance to those which have been already published by different authors, and the differences which they presented to us with respect to the nature of the symptoms are also found in the latter. We shall now present an analysis of thirteen cases, four of them within our own observation: namely, — the four preceding cases; and nine of them which have been collected by others.*

In these thirteen cases the mind presented the following state: — Frequently it continued sound throughout. In one case, being at first sound, it became disturbed towards the end, and some delirium came on during the last twenty-four hours; but in this case, which is our first, there was found, on examining the body, considerable injection of the membranes and of the cerebral substance. In two other subjects, the intellect, without being lost, became dull, as occurred in the subject of our fourth case, and in another quoted by M. Monod. In three other instances the disease commenced with sudden loss of consciousness. In one case it was some days after the attack of a continued fever that the patient fell into coma.

In two cases the speech was altered; it was not lost, but merely became embarrassed in the subject of M. Monod's case; it was, on the contrary, completely lost in a case cited by M. Lallemand, in which the cerebellum was the only part of the nervous centres appreciably altered.

Whilst the changes with intellect were variable, inconstant, and of little importance, the lesions of motion, on the contrary, were observed in all the cases except one; and again, in this case it is not quite certain that motion was not impeded. It is said that the patient fell into coma; but there does not appear to be anything certain with respect to the state of the limbs, and, besides, this case leaves some doubts regarding the nature of the alteration of the cerebellum.

There remain then twelve cases, out of thirteen, in which the power of motion is evidently changed.

* Parent Duchatelet et Martinet, Traité sur l'Arachnitis, p. 420. Rostan, Ramollissement du Cerveau, 2d Edit. p. 143. Lallemand, Maladies l'Encephale, Lettre ii., p. 34; Lettre v., p. 330. Serres, Anatomie du Cerveau, tom. ii., p. 616 (Deuxieme Observation). Chambeyron, Thèse. Dany, Memoires de Médecine Militaire, tom. xxii., p. 379. Monod, Nouvelle Bibliothéque Médicale, 1823, tom. iii., p. 74.

In two cases, the alteration consisted in a sort of convulsive agitation of the limbs, this agitation being equal on both sides. One of these cases forms the subject of our fourth case, the other is detailed by M. Monod.

Finally, in the ten other cases the existence of paralysis was ascertained, either simple, or with contraction of the parts deprived of voluntary motion.

Out of these ten cases the lesion of motion was observed nine times in the limbs of the side opposite to the hemisphere of the cerebellum, where the softening took place — once it was found to have taken place on the same side as the softening. This exceptional case was published by M. Rostan. It was that of a woman, sixty-three years of age, who entered the infirmary of the *Salpétrière* to be treated for pneumonia, of which she died. This woman had, for a long time back, the right arm contracted, and could not perform any motion with it; the three other limbs had preserved their natural motion. This paralysis was established gradually, and had been preceded by a numbness which occupied successively the hand, forearm, and arm. The autopsy showed no alteration in the nervous centres except the following: — The lower part of the right side of the cerebellum, near the annular protuberance, presented a depression produced by an exostosis which occupied the corresponding part of the petrous portion of the temporal bone, and of the portion of the occipital which is articulated with it. The substance of the cerebellum in contact with this exostosis was *softened.*

Is it in consequence of its particular seat, that in this case the softening of the cerebellum gave rise to a paralysis on the same side; or may it not be asked whether the lesion of the cerebellum was really here the cause of the paralysis, for the vertebral canal was not examined? Now, might it not have happened that another exostosis was developed on a point of the parietes of this canal, and that by compressing the part of the spinal marrow on the right, it really was the cause of the paralysis of the right side?

In all these cases, besides, the paralysis most frequently attacked the two extremities of one side at once. Sometimes it was established suddenly; at other times, on the contrary, it commenced by a slight weakening of the limbs, which gradually increased.

The paralysis of the extremities was but very rarely accompanied by paralysis of other parts of the body; once only there was observed a paralysis of the face, which took place on the same side as that of the extremities. How shall this fact be explained in our present knowledge of anatomy. The case was published by M. Lallemand.* The subject of it suddenly lost consciousness: on coming to himself, he had hemiplegia of the right side, and the angle of the commissure of the lips was drawn to the left side. A softening of the white substance of the left lobes of the cerebellum was observed, and no other lesion.

* Loc. cit., Lettre ii., p. 134.

Strabismus was remarked in only one case: it took place on the side opposite to the softening.

The sensibility presented several alterations, but none of them were constant.

At first several patients complained of a pain, the seat of which corresponded exactly with half of the lesion; this pain had its seat at the occiput, but it was entirely wanting in more than one case.

The cutaneous sensibility presented the same differences as in the case of softening of the cerebral hemispheres; sometimes it was abolished, and sometimes more acute than usual; sometimes it continued in its normal state. In the case in which coma existed, the entire skin was insensible; except those cases, the loss of insensibility existed only in the paralysed limbs.

Once only that same insensibility of the conjunctiva was observed which is found to exist in cases where the fifth pair of nerves is affected; at the same time, says M. Lallemand, to whom we are indebted for the knowledge of this fact, the eye was as it were withered.* What bond, then, unites certain fibres of the cerebellum to the fifth pair?

Digestion, circulation, and the different secretions presented nothing remarkable. In some cases the respiration was very much modified, as may be seen in our fourth case.

With respect to the genital organs, there is reference made to one only of the thirteen which form the subject of our analysis. This case was published by M. Dany: the patient, says this physician, *continually applied his hand to the testicles, though these organs presented no trace of suffering.*

In all that has been said, there is as yet mention only of the cases in which one of the lateral lobes of the cerebellum alone was softened. Let us now consider the cases in which the softening affected the entire cerebellum. Only three cases of this kind have been published to our knowledge.

In one of these three cases,† the individual, who was a child of fourteen months old, was attacked with epileptic fits, in which he died. During his illness it was noticed that the penis was in a state of half-erection. The cerebellum was softened and diffluent at its base on both sides. But the same softening affected the upper portion of the spinal marrow.

In the second case‡ an erotic delirium was observed with the phenomenon of erection. The author of this case states, without more detail, that the grey substance of the cerebellum was everywhere softened. Was it only the external grey substance?

In the third case§ phenomena of an entirely different nature took place. The patient evinced an extraordinary tendency to fall back; when he sat down he could not rise without much difficulty; one

* Lallemand, Lettre ii., p. 134.
† Revue Médicale, tom. i., p. 338.
‡ Archives Générales de Médecine, tom. xxii., p. 133.
§ Journal de Physiologie Experimentale, &c., tom. vi.

time when in the erect posture, the first movement of his feet was in a lateral direction, without his leaving the place where he was. In order to change his position, he directed his feet from before backwards: he assured us that an irresistible force obliged him to go backwards. In this case the lesion of the cerebellum was much more considerable than in the two preceding cases; it was, *in its entire extent*, changed into a whitish mass, in which there was no longer discovered any trace of organization. Thus the functional disturbances occasioned by softening of the cerebellum vary according to the greater or less extent of this softening, and to the parts affected.

SECTION III.

ACCIDENTAL PRODUCTS DEVELOPED IN THE CEREBELLUM.

Case 1.—Cyst filled with pus in the centre of the left hemisphere of the cerebellum—Pain at the base of the occiput—Paralysis, with contraction of the extremities of the right side—Convulsions at intervals—Intellect sound.

A girl, nineteen years of age, was paralysed in the entire right side of the body, when she was admitted into the *Hôpital Cochin*. The upper paralytic extremity was at the same time very much contracted, and she experienced acute pains in the part from time to time. She also felt, towards the upper part of the nape of the neck, acute lancinating pains, which returned occasionally. In the interval between these she felt towards the same part a dull pain, which seemed to her to lessen when she inclined the head forwards, and a little to the left; she usually kept in this position. She told us that she first began to feel pain in the back part of the head, and that some little time after the extremities of the right side lost the power of motion. All this period amounted to five weeks. The intellect was clear.

A little time after her admission the pains of the occiput and back part of the neck became more and more acute, and convulsive movements soon supervened. These always commenced by a violent shaking of the head, which was inclined backwards, as in a variety of tetanus. On some days the convulsions were confined to this part; at other times they became general, and almost all the muscles of the body became affected. Consciousness was still preserved.

The convulsions still went on increasing both in frequency and intensity; they extended to the respiratory muscles, and she died in a state of asphyxia. She vomited frequently towards the close.

Post-mortem.— The left hemisphere of the cerebellum was occupied some lines beneath its upper surface by a cyst as large as a pullet's egg, filled with greenish pus; the parietes of this cyst, formed of a sort of cellulo-fibrous tissue, were about a line in thickness. Around it the nervous tissue was healthy.

Remarks. — This case of encysted abscess of the cerebellum resembles very much, with respect to the symptoms, some cases of softening of the cerebellum detailed above. We find here both the occipital pain and the paralysis, the seat of which is always opposite to that of the lesion. Here also, as in several of these cases of softening, the mind remained clear. But there is in this case a prevailing phenomenon; that is, the convulsions, the constantly increasing intensity of which always ends fatally. The vomiting observed towards the close was not connected with any morbid change of the stomach; like the convulsions, in the nature of which they participated, they were the result of disturbance of the innervation. This abscess formed slowly, and did not succeed to any acute disease, nor was it caused by external violence.

Let us now add to this case a notice of some others of abscess of the cerebellum, published by different writers.

The cases of this kind which we have been able to collect amount to eleven. In eight of them the abscess occupied one of the lateral lobes of the cerebellum; in two others the suppuration occupied the two lobes; and in one case only it was the middle lobe that was affected.

An analysis of these eleven cases and of our own gives the following results: — The mind was not disturbed in any case, except sometimes at the end: in several cases it is said the patients die possessed of all their consciousness. In the individual who forms the subject of one of Dr. Abercrombie's cases, continual drowsiness was observed; but the patient could be easily aroused from it, and then he enjoyed all his intellect.

The power of motion remained entire in six cases. In five of them one of the lateral lobes of the cerebellum was the seat of the abscess; in the sixth it was the middle lobe.

Paralysis took place in three cases, but with particular circumstances in each of them.

Thus, in the case above recorded, there was hemiplegia with contraction on the side opposite to the diseased lobe of the cerebellum.

In another case, quoted by Borsieri from Plancus, there was also hemiplegia, but on the same side as the abscess of the cerebellum.* This case would form the second exception which we meet to the law of the crossing influence of the hemispheres of the cerebellum; the first exception was furnished by M. Rostan.

In a third case, cited by M. Larrey, the paralysis at first affected the two lower extremities; and subsequently it became general.

* Dextrum cerebelli lobum abscessu magnam partem corruptum vidit Cel. Lanus Plancus Ariminensis in nobili puero, qui a suppresso puris ex aure ejusdem lateris fluxu, cui a primis usque annis obnoxius fuit, inciderat in acerrimam cephalalgiam cum febre continuâ acutâ, ex quâ intra breve temporis spatium mortem oppetiit. Febris pluries intra diem exacerbatur, et horrifica, erat, sic ut hemitritæo similis videretur. Accedebat subinde aphonia et trismus sed brevi adibat loquendi potestas. Tandem *paralysi non oppositi, ut moris est, sed ejusdem lateris correptus, sensibusque orbatus, fato cessit.*

In this case the suppuration attacked the two lobes of the cerebellum at once.

A remarkable alteration of motion was noticed in M. Lallemand's case. The patient staggered on his legs. In this case, the only one which tends to confirm the opinion of the physiologists, who assign to the cerebellum the province of regulating motion, the cerebellum was converted into a pouch full of pus.

To complete the table of the different disturbances of motion, which took place in the twelve cases of abscess of the cerebellum now analysed, we should add, that in the case of Plancus already cited there was a well-marked trismus, and in one of Abercrombie's cases, where the abscess occupied but one of the lobes of the cerebellum, strabismus was observed.

Such are the different disturbances affecting motion in these twelve cases. Let us now see what were the disorders of sensation.

In only one case (and that was seen by ourselves) the limbs, but only those which were paralysed, were the seat of acute pains. In no other case was the sensibility affected.

In nine cases there was pain of the head; and in all it was remarkably severe; sometimes it was continued, sometimes intermittent. Four times the seat of this pain was not determined; three times it occupied the occipital region: twice the frontal and occipital regions, alternately in one case, simultaneously in the other; once it was confined to the anterior part of the head.

In only one case was there blindness; it was in the person seen by Gall, in whom the two lobes of the cerebellum were in a state of suppuration. But Gall adds, that the commissure of the two lobes of the cerebellum (pons Varolii) was very much atrophied, and of a yellowish colour. Now did not the morbid state of this part involve the fifth pair of nerves?

In nearly half the cases there was observed either nausea or vomiting. These phenomena were not a mere complication; they were certainly connected with the affection of the cerebellum.

The generative functions presented nothing particular, except in one case. It was that recorded by Gall, in which the suppuration attacked the two lobes of the cerebellum. The subject of this case was a boy thirteen years old, who gave himself up furiously to onanism.

Among these twelve cases, there are some in which the affection presented the phenomena of its commencement and progress of acute inflammations; in others, on the contrary, the suppuration took place imperceptibly without the symptoms of an acute affection having been observed at any period. In cases of this latter kind, the duration of the disease was sometimes very long.

Case 2.—Tuberculous mass in the left lobe of the cerebellum—pain of the head—Hemiplegia on the left side—Blindness—Intellect retained.

A laceman, aged twenty-nine years, presented the following state:—such a weakness of sight that he could scarcely distinguish day

from night, and yet considerable contraction of the two pupils; natural sensibility of the face still preserved; pain all over the head, but more acute towards the occipital region; hemiplegia of the left side complete, without contraction, or modification of the sensibility of the paralysed limbs. Nothing remarkable in the movements of the tongue; intellect sound; frequent cough; some dyspnœa; pale and emaciated; subject to diarrhœa. He entered *La Charité*, where for the first fortnight he complained of nothing additional, except that during this time he had diarrhœa, for which leeches were applied to the anus. He told us that, for about the last three years, he had a very painful headache, intermittent at first, and which subsequently became continued; he also states that, during this time, he gradually lost the power of seeing, and that of motion in the extremities of the left side; still further, about two years ago, he continued struck for the space of three months with complete insensibility of all the left side of the face. Then he no longer had any taste for food, and the mucous membrane lining the interior of the left cheek seemed to be separated, as if by a piece of linen, from the objects brought in contact with it. He always continued to hear equally well with both ears.

After a fortnight's stay in the hospital, he was carried off in less than three days by an acute peritonitis.

Post-mortem. — *Cranium.* — Nothing remarkable in the cerebrum. But on viewing the cerebellum externally, its right lobe was observed no longer to have its usual form; it was marked with eminences (*bosselé*), and its laminæ no longer have their ordinary direction, nor their natural relations; several were effaced. We scarcely penetrated some lines in depth, when in the inner half of this lobe, and in all its height, we find, instead of the tissue which should form it, a hard substance of a yellowish white colour, possessing all the characters of tubercular matter; there was no softening in any part.

Thorax. — Some miliary tubercles were scattered through the two lungs.

Abdomen. — The peritoneum was filled with a purulent liquid. A great number of small white bodies projected from the mucous membrane of the ileum, and resembled so many tubercles. Small ulcerations were found towards the end of this intestine, one of which established a communication between the interior of the intestinal canal and the peritoneum; whence the peritonitis. The spleen also contained some tubercles.

Remarks. — A pain, the principal seat of which was in relation with that of the lesion; paralysis which took place on the side of the body opposite to the latter; and the loss of sight: such were the symptoms accompanying in this case the development of the tubercular matter in one of the lateral lobes of the cerebellum. They are the same symptoms as those occasioned by the different affections of the cerebellum already described, only here they are developed very slowly, and continue much longer. In the midst of all this dis-

turbance the intellect remained undisturbed. With respect to the extraordinary loss of sensibility, observed for the space of three months in the left side of the face, and which was accompanied by the complete abolition of the sense of taste, could this have been occasioned by a temporary affection of the fifth pair of nerves?

There were tubercles in several other organs also, as well as in the cerebellum. Those contained by the lung confirm the law laid down by M. Louis.

Case 3.—Several tubercles in the right lobe of the cerebellum—Occipital headache—Vomiting—Pulmonary phthisis.

A man, twenty-three years of age, entered *La Charité*, with the ordinary symptoms of pulmonary phthisis already far advanced. This man was also tormented for more than a year by a fixed pain seated in the occiput, more particularly towards the right side of this bone. This pain, which was usually dull, became occasionally very acute. Besides, the patient for some months back was annoyed with vomiting, which was frequently repeated; this vomiting always came on whenever the headache became more intense; it returned even without such a precursor; appetite tolerable; no pain in the epigastrium; appearance of the tongue natural; diarrhœa. He died of phthisis, without presenting any new symptoms referrible to the nervous centres.

Post-mortem. — Five tubercles in the right lobe of the cerebellum, three of which were of the size of a common pea, another that of a large nut, and another that of a chestnut at least. None of them were softened; between them the tissue of the cerebellum was healthy; two of these tubercles were situated near the upper surface of the organ, and the others were developed in the very centre of the lobe of the cerebellum.

Thorax. — Cavities and numerous tubercles in the two lungs.

Abdomen. — Stomach healthy; ulcerations in the intestines.

Remarks. — Very different from the preceding, this case presents to us an instance of tubercles of the cerebellum announced by very few symptoms. The pain of the head is the only phenomenon, the long and continued existence of which announced a lesion of the encephalon; motion remained perfectly entire. The vomiting we think connected with the disease of the cerebellum. On the one hand, no lesion of the stomach accounted for it, and on the other hand, we have seen this same symptom supervene in several other cases of disease of the encephalon in general, and of the cerebellum in particular. We have even seen cases in which, either for the entire duration of the disease, or in some of its periods, vomiting was the only phenomenon which we could connect with the cerebral affection, so that the latter, leaving sound the different functions of the life of relation, confined itself exclusively to the stomach, whose action it disturbed. Dr. Abercrombie was so struck by the frequency of this occurrence, that in his treatise on Diseases of the Brain, he has ranged under a particular head a certain number

of cerebral affections of a very different nature, but which all resemble each other in this, that the prevailing symptoms to which they give rise are referrible to the digestive organs.

There are cases also where these symptoms are quite concealed, where the headache itself does not show itself, and in which there are discovered in the cerebellum tubercles more or less numerous, without there having existed during life any disturbance on the part of the nervous centres; similar cases are not rare, particularly in children. We have met with a case of a boy ten years old, who died of phthisis, and who never complained at all of the head, yet the left lobe of the cerebellum contained four tubercles.

These cases remind us of another which was very remarkable, and in which no symptom was observed on the part of the nervous centres, though an important part of them was the seat of a well-marked cancerous degeneration.

The subject in this case was a woman forty years of age, who died of cancer of the uterus, without having ever presented any symptoms but such as usually attend this affection; the cancer was confined to the neck of the uterus. The portion of the medulla oblongata forming the anterior wall of the fourth ventricle, and which constitutes the posterior part of the great commissure of the cerebellum, immediately behind the *tubercula quadrigemina*, and as far as the anterior extremity of the *corpora restiformia*, was changed into a tissue similar to that occupying the neck of the uterus.

Case 4.—Extraordinary sensibility of the skin of the trunk and extremities—Paralysis of one of the sides of the face—Two tubercular masses, one of which was seated in the left lobe of the cerebellum and the other in the vertebral canal—Pulmonary phthisis.

A boy, seventeen years of age, presented all the signs of pulmonary phthisis, when he was received into *La Charité*. He also exhibited some symptoms which indicated a serious lesion of the nervous system. His state was as follows:—

Habitual retroversion of the head; it could, however, be easily brought forward, but if left to itself it soon resumed its former position. The extremities retained all their freedom of motion; the senses were sound; but the moment any point of the skin was touched, whether of the limbs or trunk, he experienced a very painful sensation; all the motions of the arms and legs were accompanied with a sort of pain, which the patient compared to that which is felt when one is fatigued. All the left side of the face was struck with the most complete immobility; neither the cheek, eyebrow, nor skin of the forehead on this side could be at all moved, and the right commissure of the lips was drawn up very much. The left eye always open, could not be shut at the will of the patient; the consequence of this was redness of the conjunctiva of this side; these different symptoms existed for several months in all the paralysed side; the sensibility was retained.

This patient died in the course of a pulmonary phthisis, without

having presented any new phenomenon on the part of the nervous system.

Post-mortem. — *Cranium.* — The sub-arachnoid cellular tissue was infiltrated with a certain quantity of limpid serum; this same serum filled the ventricles; the left lobe of the cerebellum was occupied, not far from its outer edge, and at nearly an equal distance from its upper and lower surfaces, by a tubercle about as large as a nut — this tubercle was not softened. On the level of the first and second cervical vertebræ, the spinal marrow was separated from the vertebræ, by a tubercular mass developed in the meninges, not large enough, however, to make any considerable pressure on the spinal marrow.

The lungs contained numerous tubercles in all stages. The intestines were ulcerated.

Remarks. — Here again was a case in which a small tubercle, developed in the cerebellum, remained completely latent. There were, in fact, but two symptoms which indicated an affection of the nervous system: the first was the facial paralysis, and the second the cutaneous hyperæsthesia,* accompanied with pain in muscular contraction. Now the paralysis of the left side of the face does not seem to us to have been caused by the alteration of the cerebellum, but, perhaps, by an affection of the portio dura of the seventh pair of nerves. Perhaps there was also a tubercle, which, developed in the bony canal in which this nerve is inclosed, had made pressure on it.

With respect to the great increase of sensibility exhibited by the skin of the trunk and limbs, and the pain whilst the muscles of these limbs were contracting, it seems to us a matter of doubt whether this phenomenon depended on the lesion of the cerebellum. We are well aware that some cases have been cited in which the changes of this organ have been followed by similar phenomena. Here, besides, there was another lesion, which, in our opinion, was more probably the cause of the extraordinary exaltation of the sensibility; that was the tubercular mass developed between the upper extremity of the spinal marrow, and the posterior wall of the bony canal inclosing it. It pressed against the posterior surface of the spinal marrow, that is, the part of this organ which the experiments of M. Magendie warrants us in regarding as the special agent of sensibility. But if the tubercular mass had increased, a time would have arrived when it would have compressed the spinal marrow, instead of irritating it by its mere contact; and then the sensibility, at first exalted, would have been destroyed.

Case 5.—A cyst filled with ossiform concretions in the right lobe of the cerebellum.

A female child, twenty months old, exhibited no other symptom during her stay in the *Hôpital des Enfans*, than a constant moving

* Hyperæsthesia, excessive sensibility, from ὑπερ, and αἰσθανομαι, to feel or perceive.—Tr.

of the head, by which this part was continually balancing from right to left and from left to right. In other respects the child seemed to evince as much intelligence as other children of the same age; her sight was good, and the motions of the limbs free; countenance pale. She died of severe diarrhœa.

Post-mortem.—The centre of the right lobe of the cerebellum was occupied by a cyst the size of a nut, which contained a great number of small concretions of irregular forms, and hard as bone: they were immersed in a gelatinous kind of liquid: around them the nervous substance underwent slight softening.

Several of the convolutions of the convexity of the cerebral hemispheres were considerably hardened.

Remarks. — A considerable number of cases have been recorded relative to tumours of different kinds developed in the cerebellum and around it, and which, in either situation, must exercise an influence on the functions of this organ, whether it be irritated, compressed, or disorganised by them.

We have found scattered, in different works, thirty-one cases of this kind. In all these cases, the tumours formed in the cerebellum or in its membranes, were sometimes cysts containing solid or liquid substances of different kinds, sometimes fibrous masses, sometimes tubercular or cancerous products.

In the great majority of these cases, the mind was preserved during the entire course of the disease; only that frequently a few days before death, a state of coma was observed, which sometimes might be accounted for by considerable injection of the entire encephalic mass, or by the presence of a great quantity of serum in the ventricles. Sometimes no lesion was found which could account for it; in the latter case it is probable that a moment arrives, when, either by its greater development, or by the fact of its prolonged existence, the affection of the cerebellum will produce a reflected effect on the rest of the encephalon, and seriously disturbs its functions; for there is certainly a consent of action between all the parts of the encephalon, and one of them cannot be for any time altered without the others ultimately feeling it.

Seven patients only, out of thirty-six, presented long before death a marked disturbance of the intellect.

One of these patients, a female, thirty-five years of age, was an idiot from birth. The right lobe of the cerebellum was compressed by a tumour which had its origin in the occipital fossa. It might be supposed that the idiocy was caused by the embarrassment of the cerebral circulation; but, is it probable that this tumour existed from birth? Now, the absence of mind was dated from this period. It is not, then, probable that, in this case, the lesions found in the cranium were the cause of the idiocy.

Another patient exhibited a loss, at first temporary, but afterwards permanent, of the memory of words. There was found in this individual an encephaloid tumour in the centre of the right lobe of the cerebellum, nearer the lower than the upper surface. A great quantity of serum also distended the lateral ventricles.

In three other patients, a general weakness of intelleet was notieed. In one of them the right lobe of the cerebellum was compressed by a tumour which belonged to the dura mater; some serum dilated the ventricles. In the second an encephaloid mass seized on the posterior and inferior part of the cerebellum, as well as the medulla oblongata. In the third, a tubercle of an inch and a half in diameter was developed on the upper surfaee of the cerebellum, in the median line.

In a seventh patient some delirium was observed. Did this delirium, which was of short duration, depend on the tubercles found in the left lobe of the cerebellum? Was it not rather the result of the injection which was detected in the pia mater of the base of the brain? These are the only cases in which the mind presented any pereeptible disturbance. The disturbances of motion are much more frequent.

Out of our thirty-six cases there are but eight in which motion was not in some way disturbed.

Complete or incomplete paralysis was observed fifteen times.

In this number there were but four who had hemiplegia; it took plaee on the side opposite to the lesion of the cerebellum in three cases, and in a fourth the two lobes were diseased.

Paralysis was also observed four times. In these four cases the cerebellum was compressed or disorganised, either in its two lateral lobes at once, or in its middle lobe. In one of these cases the medulla oblongata participated in the alteration of the cerebellum. It is remarkable that in these four cases the paralysis particularly affected the lower extremities, whilst the upper ones enjoyed all their freedom of motion, or else had undergone only a debility whieh was always less than the lower extremities.

Two patients presented a paralysis, or at least a considerable debility of the four limbs. In one of them, a tubercular mass, developed at the base of the cranium, compressed at once the cerebellum and spinal marrow; in others the two lateral lobes of the cerebellum contained tubercles, but they were twice as large in the right lobe as in the left; and the feebleness of the limbs was greater on the left than on the right; so that this case of general paralysis may again serve to prove the crossing influence of the lobes of the cerebellum.

The paralysis of the faee, whieh we met onee in one of our own cases, isolated from every other paralysis, was conneeted with the existence of two tuberculous masses; the one developed on the left lobe of the cerebellum, and the other at the posterior surfaee of the spinal marrow.

There remain four patients, of whom nothing else is said with respect to motion except that *they gradually become debilitated.*

Involuntary eontractions affecting a greater or less number of muscles were observed more frequently than paralysis; we met twenty-two cases in which these contractions were found to exist. In fifteen of these twenty-two cases, the entire body was agitated

at intervals by convulsive movements, which became more and more frequent, and it was often in the midst of violent convulsions that the individuals died. Some, and that was the greatest number, retained their consciousness during the continuance of their convulsions; others lost it suddenly, and they presented the symptoms which characterise an attack of epilepsy. In these patients, the lesion occupied different seats; sometimes confined to a single lobe of the cerebellum, sometimes extending to the two, sometimes occupying also the medulla oblongata.

The movements of the tongue were embarrassed in only two cases, and in both it results from the seat of the lesion, that the nerve of the ninth pair must be compressed or disorganised by the tumour pressing on the cerebellum.

In the thirty-six cases which form the subject of our analysis, the sensibility presented disturbance not less varied than the power of motion.

The general sensibility presented no disturbance in the greater number of cases: sometimes, however, it exhibited a remarkable exaltation, whilst at other times it was completely abolished.

Not merely has the general sensibility been modified in some of our thirty-six patients; occasionally, also, the organs of the particular senses have been found affected; thus, in one case, deafness was observed; and in six, vision was either completely destroyed, or very much weakened.

Among the organs of nutritive life, the stomach is the only one which presented a phenomenon deserving of particular notice, with respect to its frequent reproduction; this phenomenon is vomiting; it was observed twelve times in thirty-six cases.

If we now consider these twelve cases with respect to the nature and seat of the disease of the cerebellum, we will find nothing different from what was to be seen in the twenty-four other cases, where there was neither vomiting nor nausea. *A priori*, we should not expect to find this peculiarity of either seat or lesion; for throughout this volume, in connexion with lesions the most different, as well those of the meninges as those of the nervous pulp itself, we have seen vomiting show itself as a common effect of a crowd of affections of the encephalon. Can it be said, that when it is produced the brain is in the same condition as when it does not occur? Certainly not, for a different effect cannot occur from a different cause; but these conditions we know not; they escape us just as those internal changes of organisation have been removed hitherto from our researches. Certainly, the inconstancy of the effects here can only be owing to the variety of causes. To ascertain those causes, it would be necessary to interrogate each cerebral fibre, first considered separately, and then traced in its connexions with other fibres. It is in this double point of view, that we think the pathology, as well as the physiology of the brain, should be studied. It is, on the one hand, a great whole, composed of a number of parts, each of which performs a special act; but, on the other hand, these different parts

are intimately connected with each other, so that they are mutually bound together. Hence it follows, that in the point where a lesion is discovered, the direct cause of the effects which it produces does not always reside, and according as it reacts on such or such other points especially destined for the performance of a certain act, it is this which will be found modified. If then it happened that we succeeded in discovering in the encephalon a certain number of parts, the lesions of which always occasioned the disturbance of the same cerebral act, it would not, in our opinion, be fair to object to the doctrine of localisation, that there are also other cases where this same functional disturbance is reproduced, though the lesion might be elsewhere.

Among the thirty-six cases constituting the subject of our analysis, only in three was anything particular noticed with respect to the genital apparatus. In one of these cases permanent erection of the penis was observed during the whole time. There was, in this case, compression made at one and the same time, by a tuberculous mass, both on the right lobe of the cerebellum, and on the medulla oblongata. In the second case the patient indulged in masturbation; several tubercles were found in the upper part of the cerebellum; whether on both sides, or on one only, we are not told. Lastly, in the third case, regarding an individual said to be very prone to venereal desires, a tubercular mass occupied all the substance of the middle lobe.

THE END.

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